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Technical Reference—

Mark V Centrifugal Extractor Controller

Read the Safety Manual

PELLERIN MILNOR CORPORATION POST OFFICE BOX 400, KENNER, LOUISIANA 70063-0400, U.S.A.

Please Read

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References to Yellow Troubleshooting Pages

This manual may contain references to "yellow pages." Although the pages containing troubleshooting procedures are no longer printed on yellow paper, troubleshooting instructions, if any, will be contained in the easily located "Troubleshooting" chapter or section. See the table of contents.

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ABOUT THIS MANUAL

Scope—This instruction manual is intended to provide commissioning, programming, operating, and troubleshooting instruction for the M7E Extractor controller. See the installation manual for information on machine installation procedures and mechanical requirements. See the service manual for preventive maintenance, service procedures, and mechanical parts identification. See the schematic manual for electrical parts identification and electrical troubleshooting.

The Normal Display Sequence at Each Power Up—Verify that the messages appearing on the display at start up are as shown in "RUNNING THE EXTRACTOR IN AUTOMATIC" (see Table of Contents). Any other message(s) indicate an error condition that must be corrected before the machine will operate. See "M7E EXTRACTOR ERROR MESSAGES."

Manual Number/Date Code (When To Discard or Save)—The manual number/date code is located on the inside front cover, upper right corner just above the manual name. Whenever the manual is reprinted with new information, part of this number changes. **If the *date code* after the "/" changes, the new version applies to all machines covered by the old version, but is improved— thus the old version can be discarded. If the *manual number* before the "/" changes, the new manual covers only new machines.** Example: Discard MATMODELAE/8739**C**V when MATMODELAE/8739**D**V is received (minor improvements). Also, discard MATMODELAE/87**39D**V when MATMODELAE/87**46A**V is received (major improvements). But keep MATMODEL**A**E/8746FV when MATMODEL**B**E/8815AV is received, since the new manual no longer applies to machines originally shipped with the old manual.

Documents and Change Bars—The individual documents comprising this manual use the same revision criteria as the manual. Text documents also display change bars. Example: When section MSOP0599AE/9135**B**V becomes MSOP0599AE/9135**C**V, change bars with the letter "C" appear next to all changes for this revision. For a major rewrite (e.g., MSOP0599AE/92**26A**V), all change bars are deleted.

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Autovac	E-P Plus®	Mildata®	Miltron	Totaltrol®

IMPORTANT OWNER/USER INFORMATION— MACHINES WITH A KEYPAD

Take the following important steps before placing this machine in operation:

1. Ensure safety of laundry personnel.
2. Protect against data loss.
3. Customize data (configure, formula, and productivity data).

Ensure Safety of Laundry Personnel

Ensure that all personnel who will operate or maintain this machine read the safety manual *before permitting them access to the machine.* Ensure that all user manuals are available to the appropriate personnel and that all precautions explained in the safety and other user manuals are observed.

Protect Against Data Loss

Follow the safeguards listed below to protect against data loss caused by human tampering, electromagnetic interference (EMI), physical damage to the data storage medium, or loss of power to random access memory (RAM).

1. Keep the *Run/Program keyswitch* set to *run* ( ) and secure the keys. Users must understand proper use of this control. See "ABOUT THE USER CONTROLS . . ." (see Table of Contents).
2. Keep all electric box doors closed and locked. Secure the keys.
3. Leave machine power on for 48 hours before customizing data. This fully charges the microprocessor battery, which will then supply power to the RAM for 90 days even if machine power is off.
4. Replace the battery board every five years. A capacitor on the processor board can supply power to the RAM for several hours with the battery removed.
5. Keep electronic back-up data and/or a printed record of all field-programmed data (e.g., wash formulas, configure values, step names, chemical names) in case of data loss. See the instructions for downloading and printing this data if the machine has this capability.
6. For machines that accumulate productivity data (e.g., count of loads processed), transcribe any needed data frequently, as described in the instructions for data accumulation.

Customize Data

When To Customize Data

- When commissioning the machine
- When restoring a machine to service after a lengthy shutdown
- When required by error message
- After replacing the CPU board
- After upgrading software (replacing EPROMs)
- After adding or removing optional equipment

What Customizing Requires—Verify configuration. Program formulas and clear productivity data, if applicable. See the programming and operating sections in this manual for instructions.

Data Accessibility—Configure and formula data can only be altered while the keyswitch is in the *program* ( ) position (data is keyswitch-protected). Productivity data, because it is accumulated in the *run mode*, cannot be keyswitch-protected and is accessible to anyone. Data is accessible to the extent described in the following table:

			Ways Data Can Be Used and Altered	+			
			Data can be read				
				Data can be over-written			
					Data can be up/downloaded		
						Data can be cleared	
Type of Data		**Machines Data Applies To**					Contents after clearing
Configure Data		dryer (includes gains)	Yes	Yes	Yes	Yes	example values
		shuttle, single-stage press	Yes	Yes	No	Yes	zeros
		two-stage press, Cobuc, Linear Costo, discharge sequencer	Yes	Yes	No	No	n.a.
		washer (and textile)-extractor, centrifugal extractor	Yes	Yes	Yes	No	n.a.
Formula Data	**step, chemical names**	washer (and textile)-extractor	Yes	Yes	Yes	Yes	example values
	formulas	washer (and textile)-extractor, centrifugal extractor, dryer	Yes	Yes	Yes	Yes	empty
Productivity Data		washer (and textile)-extractor, centrifugal extractor, dryer	Yes	No	No	Yes	empty

If Data Becomes Corrupt—If the microprocessor senses that data is unusable or unreliable, an error message will appear (usually at power-up), possibly preventing machine operation. The consequences and appropriate actions for each error message are explained in the troubleshooting instructions. Follow these instructions exactly to ensure that corrupt data is completely eliminated and replaced with valid data. Failure to do so may result in unsafe operation or machine damage.

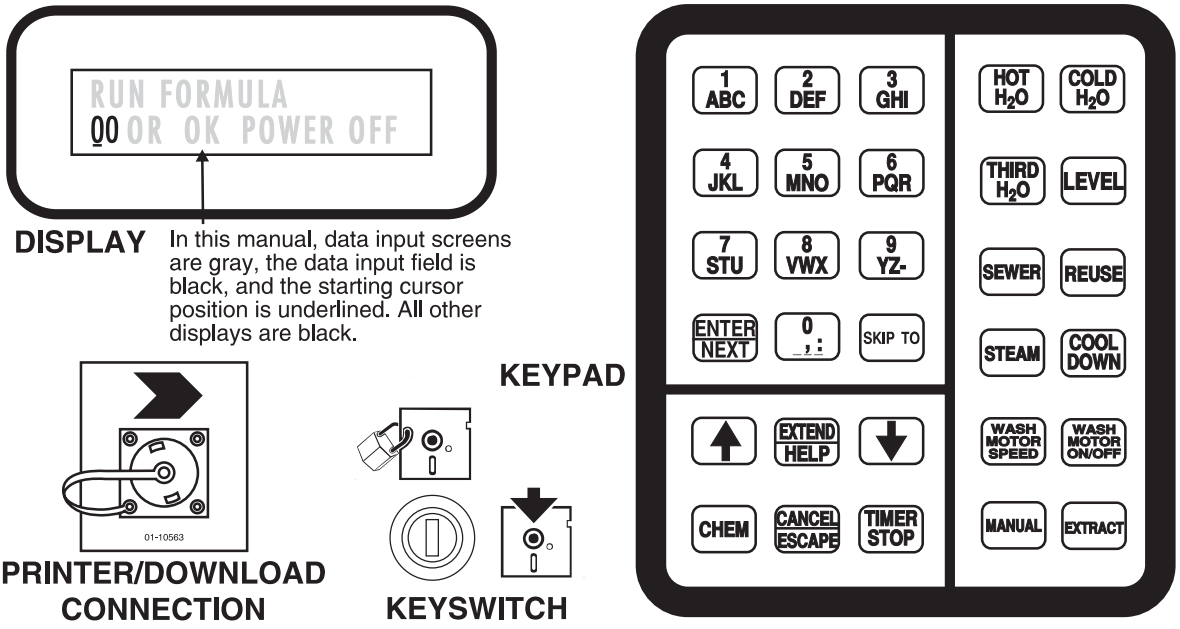
ABOUT THE USER CONTROLS— MACHINES WITH A KEYPAD

User controls are of two types—electro-mechanical controls (switches, buttons, and status lights) and microprocessor interface controls (display, keypad, keyswitch, and printer/download connection). Controls are mounted on one or more nameplates on the machine or a separate electric box.

NOTE: Do not attempt to use your machine merely by referring to the descriptions of controls. Read the operating, programming, and troubleshooting instructions throughout this and the operator manual.

Electro-Mechanical Controls

Electro-mechanical controls vary with machine model and are explained in the machine-specific operator manual furnished with the machine.



Example Key Symbols Used in the Text

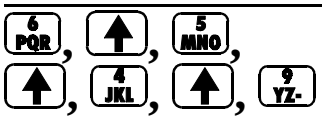
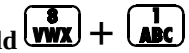
Symbology	What It Means
B	Turn the *keyswitch* clockwise to *program* ( ), then press and release the *Enter/Next key*.
	Turn the *keyswitch* counterclockwise to *run* ( ), then press and release the *Enter/Next key*.
	Press and release the key shown.
	A slash between symbols means use either key shown. The *up* and *down arrow keys* are often shown this way (i.e., scroll up or down the menu choices).
	Typical example of a **word entry** (spells out "POLY"). In *word (alphanumeric)* data fields, press the *up* or *down arrow* key to move right or left to the next character position. Press each key until the desired character appears (e.g., press 6 PQR until "P" appears). A comma between symbols means press and release each key sequentially.
	Typical example of a **number entry** (enters the value 155). In *numeric* data fields, the cursor automatically advances to the next character position when each numeral is entered.
	A " + " between symbols means press *and hold* each key in the order shown until all keys are depressed *at the same time*, then release all keys.
hold 	Key(s) must be held depressed for the intended action to occur. Action will stop when key(s) is (are) released.
<xx> **<response>** **<password>**	This is an alternative way of depicting word and number entries when the exact values are determined by the user. <xx> means enter a two digit number. <response> means enter the value prompted for by the display. <password> means enter the password (or numeric passcode).
	Press and release the *Stop button* ( ).
B	Press and release the *Start button* ( ).

FIGURE 1 (MSOP0235BE)
Microprocessor Interface Controls and Example Key Symbols

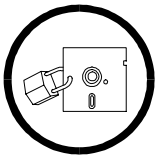
Microprocessor Interface Controls

These controls, shown in FIGURE 1, include the *keyswitch, display,* and *keypad*, located on the main nameplate (position on nameplate varies), and the *printer/download connection*, located on its own nameplate. These controls permit the user to pass data to and from the microprocessor controller.

NOTE: This section folds out so that you may continue to refer to FIGURE 1 as you review the remainder of this manual.

Keyswitch—This key-operated switch provides security for all field-programmed data in memory. With the *keyswitch* set to *run* ( ), this data cannot be changed. The key cannot be removed in the *program* ( ) position.

⚠ CAUTION ⚠



DATA LOSS HAZARD—Improper use of the *keyswitch* may corrupt program data.

- ☞ **Return to the run mode only when the display says *Ok Turn Key to Run*.**
- ☞ **Only power off or on with the *keyswitch* at *run*.**
- ☞ **Do not leave the key accessible to unauthorized personnel.**

Display—This two- or four-line device displays *messages* and *data entry screens. Messages* inform the user as to the machine's operating status or alert the user to conditions that must be satisfied before operation can continue. ***Message displays* in this manual are normally black.**

Data entry screens prompt the user to enter data at the keypad. As keys are pressed, the data appears in the data input field on the display. A blinking *cursor* always shows where the next character will be entered. ***Data input screens* in this manual are gray, the data input field is black, and the starting cursor position is underlined.**

Keypad—The 12- or 30-key keypad is used for programming, making selections (e.g., selecting formulas in a washer-extractor), responding to display messages, certain normal operating procedures, and manual operation. Applicable procedures are explained in the remainder of this manual and depicted using symbols to indicate pressing keys on the keypad. These symbols are explained in the "Example Key Symbols Used in the Text" in FIGURE 1. Keep FIGURE 1 folded out when reviewing procedures elsewhere in the manual that require the keypad.

NOTE: Some keys on the 30-key keypad are not used on some machines.

Printer/Download Connection (if so equipped)—Connect a Milnor®-supplied printer here to print field-programmed data (e.g., formulas) and accumulated data (e.g., count of loads processed), if applicable. Connect a Milnor®-supplied serial downloader here or interconnect between machines to copy field-programmed data between devices. Printing and downloading, if applicable, are explained elsewhere in this manual.

DEFINITIONS OF TERMS AND ABBREVIATIONS

The following terms and abbreviations are used in documents relating to Milnor® equipment. Because this text is used in several manuals, some of the terms may not apply to this manual. In the following list, a "CBW® system" may include, but is not limited to, the following equipment: CBW® washers, loading conveyors or rail system, extraction system, and receiving conveyors.

Term	Applies to these machines	Definition
Allied Device	CBW® system; Dryer	any device not manufactured by Milnor®, but associated with or connected to Milnor® equipment.
Allied Discharge	CBW® system; Dryer	situation where an allied device is used to unload a Milnor® machine; see also **Allied Device**.
Allied Loading	CBW® system; Dryer	situation where using an allied device to load a Milnor® machine; see also **Allied Device**.
Auto Pass Empty	CBW® system	method, via compatibility C-Bits, of automatically sending through one or several "empty pockets" so as to clear incompatible liquors through normal counterflow.
Auto-Purge	CBW® washer	procedure by which the shell, shell sumps, and weir boxes of tunnels with drain valves and rapid refill valves (standard on WorkWear tunnels) are flushed of heavy insoluble particles, refilled, reheated, and redosed with chemicals based on a commandable number of transfers since the last purge.
AutoSpot	washer-extractors	a control mechanism with which the operator can automatically align one cylinder pocket of a divided cylinder machine with the loading doors.
Batch	CBW® system; Dryer	group of goods that are to be processed together.
Batch Code	CBW® system; Dryer	information for the Miltron controller about how to process the goods in the batch.
Bath	CBW® washer, washer-extractor	a general term for any step of a wash formula during which the goods are exposed to water and/or chemicals.
Bath Exchange	CBW® washer	system whereby formulas can be classified as being "good" or "bad" relative to each other; includes software and hardware to prevent the transfer of good goods into a bad bath and to prevent the flow of bad water and/or chemicals into a good load of goods.

Term	Applies to these machines	Definition
CPU (Central Processing Unit)	all microprocessor-controlled models	integrated circuit component—usually an Intel 8088 and its ancillary devices—that interprets programming instructions and inputs to the microprocessor and provides outputs to other devices.
C-Bit (Control Bit)	CBW® washer	programmable Miltron controller output used to control various discretionary functions in the tunnel, including temperatures, chemical injection, etc.; C-Bits are assigned to specific locations in the load system, tunnel, extraction system, etc., and can be commanded to turn on according to a washing formula.
C-Bit Attributes	CBW® washer	values assigned to a C-Bit which define or control its functions.
C-Bit, Compatibility	CBW® washer	scheme whereby a C-Bit may be actuated based on a comparison of goods now in a module with goods that previously occupied that module (called "Forward Compatibility"), or with goods that will next occupy that module (called "Backward Compatibility").
C-Bit, Compatibility, Backward	CBW® washer	see **C-Bit, Compatibility**
C-Bit, Compatibility, Forward	CBW® washer	see **C-Bit, Compatibility**
C-Bit, Compatibility, Direct	CBW® washer	Compatibility C-Bit in which each C-Bit value is commanded directly on its appropriate Display P.
C-Bit, Compatibility, Indirect	CBW® washer	Compatibility C-Bit in which each C-Bit value is commanded on its appropriate Display L, and the instruction to actuate commanded on its appropriate Display P.
C-Bit, Dedicated	CBW® washer	C-Bit for which discrete values may be commanded for each of the 256 goods classes instead of for each of the 16 basic formulas. See also **C-Bit, Standard**.
C-Bit Hold Code	CBW® washer	C-Bit attribute that answers the question, "If the CBW® washer goes into Hold while this C-Bit is ON, should the C-Bit turn OFF even if its C-Bit time value has not expired, or its commanded temperature has not been achieved?"
C-Bit Init Code	CBW® washer	C-Bit attribute that specifies when, during the time between transfers, a C-Bit controlled action starts.

Term	Applies to these machines	Definition
C-Bit Op Codes	CBW® washer	C-Bit attribute that modifies C-Bit behavior to suit a specific function. For example, when a C-Bit is assigned Op Code 04 (Drain), all other C-Bits in the module turn off whenever the C-Bit opens the drain valve.
C-Bit, Standard	CBW® washer	C-Bit for which discrete values may be commanded for each of the 16 basic formulas, but not for each of the 256 possible goods classes. See also **C-Bit, Dedicated**.
C-Bit Steam Code	CBW® washer	C-Bit attribute to specify when the Steam C-Bit will turn on to satisfy the commanded temperature.
C-Bit Value, On-time	CBW® washer	C-Bit Value in seconds for time-based functions.
C-Bit Value, Temperature	CBW® washer	C-Bit Value for temperature-based functions; in degrees: Fahrenheit or Celsius.
Cake	CBW® system	batch of goods after discharge from the Press.
CBW®	CBW® washer	registered trademark to describe the Milnor® Continuous Batch Washer.
CCW	all models	counterclockwise cylinder rotation, *as viewed from the load end* (looking toward the discharge end); see also **CW**.
CCWLS	CBW® washer	counterclockwise limit switch to determine the limit of CCW rotation during reversals; see also **CWLS**, **TDCLS**, **SAFETY**.
Central liquid supply system	washer-extractor	chemicals are constantly supplied to the machine under pressure; valves on the machine open and close to regulate the flow of chemicals into the machine.
Centrifugal Extractor	CBW® system	extraction device to which tunnel may pass batches; extraction is by spinning goods in a cylinder.
Checksum	all microprocessor-controlled models	one of several numbers generated by the control that represents the amount of data in a specific memory area; any change in a checksum indicates that data has changed.
Clean side	washer-extractor	the side of a pass-through machine from which clean goods are unloaded after processing.
COBUC	CBW® system	Milnor® shuttle for transporting loose wet goods from the CBW® washer to an extraction device (may traverse and/or extend to load).
Code, Customer	CBW® system; Dryer	code that identifies the 1 of 1000 possible “owners” of a batch.

Term	Applies to these machines	Definition
Code, Destination	CBW® system; Dryer	code that identifies the 1 of 64 (if the Miltrac controller) or 1 of 8 (if Allied Data Pass) desired post-dry or no-dry destination of a batch.
Code, Dry	CBW® system; Dryer	code that identifies the 1 of 16 × 2 desired dry cycles for a batch.
Code, Formula	CBW® washer	code that identifies the 1 of 16 basic wash formulas used to process a batch.
Code, Goods	CBW® washer; Dryer	code that identifies the 1 of 256 goods classifications that describe a batch and invoke any variations to the basic formula used.
Code, Init	CBW® washer	see **C-Bit Init Code**
Code, Single Cake	CBW® system	code that specifies that receiving device (shuttle, dryer, etc.) should handle only a single cake instead of its maximum capacity of cakes.
COELF	CBW® system	Milnor® non-traversing, elevating shuttle conveyor for pressed cakes.
COHORFP	CBW® system	Milnor® horizontal conveyor that pivots and elevates a single pressed cake for transfer to the next receiving device, or holds a cake when next receiving device is full.
COINC	CBW® system	Milnor® inclined conveyor that pivots and elevates a single pressed cake for transfer to the next receiving device, or holds a cake when next receiving device is full.
COLOOS	CBW® system	Milnor® traversing, elevating, and extending conveyor for loose or pressed extracted goods.
Compatibility, Direct	CBW® washer	see **C-Bit, Compatibility, Direct**
Compatibility, Indirect	CBW® washer	see **C-Bit, Compatibility, Indirect**
Conditioning	Dryer	dryer program in which only a portion of the moisture in the goods is removed.
Configure	CBW® system; Dryer	microprocessor programming for various software and hardware options on machine.
CONLO	CBW® system	Milnor® loading conveyor with partitioned belt which loads loose goods into CBW® washer; each partition holds one batch.
Control	all microprocessor-controlled models	control box, usually housing a keypad, at which the user commands action and programs the machine; also includes all electromechanical devices on the machine involved with its operation.

Term	Applies to these machines	Definition
Controller	all microprocessor-controlled models	control box, usually housing a keypad, at which the user commands action and programs the machine.
CONWA	CBW® system	conveyor similar to CONLO, but includes built-in goods weighing and "authorized" load weights indicator. See **CONLO**.
Cooldown, Dryer	Dryer	gradual temperature reduction after the drying cycle to ensure goods are not discharged too hot.

⚠WARNING⚠

Always program sufficient cooldown time to cool goods. Goods that are discharged too hot can catch fire by spontaneous combustion—sometimes many hours after the laundry has stopped working.

Cooldown, Reuse (Flush) Tank	CBW® washer	methods of reducing the temperature in the Reuse (Flush) tank.
Cooldown, Washer	CBW® washer	method of reducing a bath temperature in a tunnel washer.
COSAT	CBW® system	Milnor® traversing, non-elevating shuttle conveyor for transporting pressed cakes.
COSHA	CBW® system	Milnor® elevating and traversing shuttle conveyor for transporting pressed cakes.
Count	CBW® washer	number of sets of CW and CCW cylinder reversals commanded for each formula.
Count-up	CBW® washer	process in which the tunnel counts the number of reversal sets remaining between transfers; in Miltron software prior to Mark VIII, this process was called "count-down," because the counter displayed the number of reversal sets already completed.
Counterflow	CBW® washer	tunnel water flow, opposite the flow of goods, from the clean (discharge) end of tunnel toward the dirty (load) end.
CPU	all microprocessor-controlled models	Central Processing Unit—the main computer chip in a microprocessor control that processes data as well as the board on which the CPU chip is mounted.
CRT	CBW® system	cathode-ray tube (also called Video Display Unit); the screen on the various controls on which information is displayed.
Customer Code	CBW® system; Dryer	see **Code, Customer**
CW	all models	clockwise cylinder rotation direction *as viewed from the load end* (looking toward the discharge end); see also **CCW**.

Term	Applies to these machines	Definition
CWLS	CBW® washer	clockwise limit switch to determine the limit of CW rotation during reversals; see also **CCWLS**, **TDCLS**, **SAFETY**.
Cycle	all models	operations undertaken in a specific order to process goods; a cycle normally ends with the device ready to accept another load.
Cylinder	washer-extractor	the perforated basket inside the machine shell which contains the goods and is rotated by the motors.
Cylinder Pocket	washer-extractor	one of the two or three divisions of a divided cylinder washer-extractor into which goods are loaded for processing.
Daisy Chain	all serial microprocessor controlled models	method of linking two or more serial type microprocessor controls with one four-conductor shielded cable. All data passes via this cable, regardless of which machines are communicating.
Data, Operational	CBW® washer	information regarding tunnel operating efficiency that is collected and held by the Miltron controller.
Default Password	CBW® system; Dryer	See **Password, Default**
Default Value	CBW® system	value used by the microprocessor control if no other value is commanded by the programmer.
Destination	CBW® system; Dryer	area or zone of laundry facility to which goods will be routed after drying or after pressing if “no-dry.”
Destination Code	CBW® system; Dryer	see **Code, Destination**
DIP Switches	all microprocessor-controlled models	Dual In-line Package switches; a row of (usually eight) miniature switches in a single housing used to permanently select (or configure) certain options on microprocessor boards; on Milnor® microprocessor controls, these switches are used most often to specify the communications “address” for each machine in a Miltrac system.
Discretionary Data Field	CBW® system	any field in the Miltron microprocessor control system that can be updated through the keyboard.
Display	all models	data appearing on the Miltron or Miltrac CRT screen; also refers to the two line by 20 character display used on some Milnor® controls.
Door, Manual	all models	machine door is opened/closed by hand.
Door, Power Operated	all models	machine door is normally operated through electro-mechanical controls rather than manually; usually machine must be energized for door operation.

Term	Applies to these machines	Definition
Dosing, First	CBW® washer	chemical injection needed to achieve the correct working concentration at start up and whenever the goods type now in the module differs from the previous batch.
Dosing, Maintenance	CBW® washer	chemical injection needed to maintain the correct working concentration whenever the goods type now in the module is the same as the previous batch.
Download	serial microprocessor controlled models	process of transferring data—usually configuration and programming instructions—from a machine to another machine or a memory storage device.
Drain Speed	washer-extractor	one of several ways to end a wash formula; goods are kept in motion at drain speed until the operator is ready to discharge them.
Dry Code	CBW® system; Dryer	see **Code, Dry**
Dry Cycle, Full	Dryer	dry cycle used when a dryer is loaded to its full capacity (e.g., a two-cake dryer with two cakes); refers to the amount of goods loaded into the dryer, not the degree of moisture removal; see also **Conditioning** and **Full Dry**.
Dry Cycle, Partial	Dryer	dry cycle used when a multicake dryer is loaded to less than its full capacity (e.g., a two-cake dryer with one cake); refers to the amount of goods loaded into the dryer, not the degree of moisture removal; see also **Conditioning** and **Full Dry**.
EPROM	all microprocessor-controlled models	Erasable, programmable Read-Only Memory; the portion of the Milnor® microprocessor control used to store the fixed instructions (software) that determine how the machine functions.
Extraction	CBW® system	removal of excess water from goods discharged from the tunnel.
Extractor, Centrifugal	CBW® system	see **Centrifugal Extractor**
Extractor, Press	CBW® system	see **Press**
Fast Fill	CBW® washer	see **C-Bit, Fast Fill**
Fire Control Unit	Dryer	electronic device used in gas-fired dryers to ensure that a pilot flame is present before allowing the main gas valve(s) to open.
First Dosing	CBW® washer	see **Dosing, First**
Flow Lifter	CBW® washer	tunnel ancillary component that accepts bath liquor from one wash zone, removes lint, and pumps liquor to a higher level in another wash zone.

Term	Applies to these machines	Definition
Flow-not	CBW® washer	valve to divert “bad” liquor to sewer instead of allowing normal counterflow into the next water-receiving module.
Flow of Goods	all models	direction goods flow through a machine that accepts goods at one end and discharges them out the opposite end.
Flow Splitter	CBW® washer	tunnel ancillary component that accepts bath liquor from the rinse zone, removes lint, and pumps part of liquor to Reuse tank and part to wash zone; permits higher level in wash zone.
Formula	all models	instructions used by the machine control to operate motors, valves, and other components during a standard cycle.
Formula Code	CBW® washer; Dryer	see **Code, Formula**
Full Dry	Dryer	dryer formula that removes virtually all moisture from the goods.
Gains, PID	Modulating Dryer; DyExtractor®	proportional-integral-differential gains, a set of constants used by the software in Milnor® dryers to determine the temperature and its rate of change at the inlet and outlet temperature probes.
Goods	all models	articles processed or conveyed by a machine.
Hard Start	Dryer	process by which dryer basket motors momentarily provide additional torque to start into motion a loaded stationary basket.
Hardware	all models	electronic boards that control the machine.
C **Hold**	CBW® washer	condition where count-up or transfer is suspended because prerequisites are not met; if caused by a loading error, flow is disabled
Home	Shuttle Conveyors	specific position along the shuttle path to which the shuttle returns upon power up; or after discharge, load, or error correction; belt is at receive level 0.
Inching	washer-extractor	a control mechanism with which an operator can manually align one pocket of a divided cylinder machine with the loading doors.
Init Code	CBW® washer	see **C-Bit Init Code**
Input, Direct	all microprocessor-controlled models	signals that enter the processor board directly; direct inputs are provided by switches on the machine, including limit switches, the Signal Cancel button, and the Run/Program keyswitch.
Input, Module	CBW® washer	signals that enter the Miltron processor board through the first I/O board of each tunnel module; module inputs are provided by level switches, module-specific circuit breakers and motor overloads, etc.

Term	Applies to these machines	Definition
Input, Standard	all microprocessor-controlled models	signals to the microprocessor controller that certain standard conditions exist; these inputs enter the processor board through the standard I/O board(s); include Bag Ready, Load Conveyor Ready, and Remote Customer and Goods Codes, etc.
Jogging	Centrifugal Extractor; Dryer	intermittent rotation of the cylinder on certain Milnor® machines can be used to dislodge goods from the cylinder wall after extraction, or to assist in discharging goods from the tilted cylinder, etc.
Level Switch	CBW® washer	device that signals the control when water has reached a preset level.
LINEAR COSTA	CBW® system	Milnor® controller to store multiple cakes on a belt conveyor.
Liquor	washer-extractor CBW® washer	bath solution usually composed of water and chemicals. B
Load	all models	the amount of goods, measured by weight or pieces, that a machine normally handles during a cycle.
Load Chute	CBW® system	stainless steel chute that directs goods into the machine.
Loading Device	all models	in a system, this is the device which loads another device; example: a shuttle may be the loading device for a dryer.
Loading Direction	all models	direction goods are loaded into/onto a device.
Maintenance Dosing	CBW® washer	see **Dosing, Maintenance**
MILDATA®	CBW® system	software that connects Milnor® Serial Microprocessor machines to a centrally located personal computer for data capture, report creation, and formula generation.
MILTRAC	CBW® system	control unit that passes batch codes between the various system components and controls the routing of goods based on machine availability and the batch codes.
MILTRON	CBW® washer	microprocessor control unit for the tunnel washer.
Minipass	CBW® washer	second character of the password used to access screens that require some security, but less than that afforded by the full password. For further explanation, see **Password**.
MMQ	CBW® system	minutes, minutes, and quarter minutes (e.g., 043=4 minutes, 45 seconds); see also **SS** and **SSS**.

Term	Applies to these machines	Definition
Model	all models	designation of machine without regard to options; for most devices, the model includes some dimensional representation of the effective machine size.
Motor Contactor Box	all models	enclosure containing the high voltage motor contactors.
C **Module**	CBW® washer	portion of a CBW used to process one batch of goods during one "time between transfers."
Monitor	CBW® system	video display screen; see also **CRT**.
No-Dry	CBW® system	station where clean, extracted, but undried goods are discharged.
Non-Dedicated C-Bit	CBW® washer	see **C-Bit, Standard**
Op Code	CBW® washer	see **C-Bit Op Code**
Output, Assignable	CBW® washer	see **C-Bit**
Output, Standard	CBW® washer	see **Standard Output**
Overhead Fast Fill Tank	CBW® washer	tank that quickly supplies water to a single, specific module when commanded.
Pass Empty	CBW® washer	see **Auto Pass Empty**
Password	CBW® washer; Dryer	three-character code entered to access or change values in certain display pages; prevents unauthorized programming; the instructions for changing the password are contained in a separate document sent only to the owner; see also **Minipass**.
Password, Default	CBW® washer	password (ABC) in the Miltron control when shipped from the Milnor® factory that automatically replaces any field-programmed password after a failed Program Memory check.
Password, Mini	CBW® washer	see **Minipass**
Permanent Press	all models	a fabric or finish which is heat-set after the article is manufactured to minimize wrinkling and retain creases.
Press	CBW® system	extraction device to which the tunnel may pass batches. Extraction is by squeezing goods under pneumatic (pre-press) pressure, then hydraulic (main bell) pressure.
Press Pressure	CBW® system	force used by a press during the extraction process; also, a code that identifies the one of up to four optional pressures that the Milnor® press should apply to a batch.

Term	Applies to these machines	Definition
Program Constants	CBW® system; Dryer	values that specify characteristics of the CBW® system not normally changed after first commissioning; program constants specify line frequency (50 or 60 Hz), minimum and maximum cooldown temperature, Mildata® address, etc.
Program Mode	all microprocessor-controlled models	mode which allows programming of wash formulas, dry cycles, and other discretionary data; see also **Run Mode**.
Pumped Chemical Supply System	washer-extractor	chemicals flow into the machine when the machine control or operator commands the pump to operate.
Rail Sequencer	CBW® washer	Miltron feature that permits programming the sequence with which bags are released from feeder rails to the main rail for delivery to the tunnel in an automated rail system.
Relay Box	CBW® washer	enclosure containing the plug-in relays external to the microprocessor; some external relays provide control logic, and some are merely slaves to microprocessor outputs.
Reversal (Set of Reversals)	CBW® washer	one clockwise plus one counterclockwise rotation of the baskets during the normal wash cycle; see also **Count** and **Count-up**.
Reversing	washer-extractor	one of several ways to end a wash formula; goods are kept in motion at wash speed by the rotating cylinder until the operator is ready to discharge them.
Rinse Zone Flow Splitter	CBW® washer	see **Flow Splitter**
Run Mode	all microprocessor-controlled models	mode of operation that allows devices to run automatically; see also **Program Mode**.
SAFETY	CBW® washer	safety limit switch; see also **CCWLS**, **CWLS**, and **TDCLS**.
Software	all microprocessor-controlled models	fixed information contained in EPROMs (programming by Milnor®) that determines how the machine functions.
Soil Side	washer-extractor	the side of a pass-through machine into which soiled goods are loaded for processing.
Spray-down	washer-extractor	a feature which allows the operator to facilitate loading the machine by spraying the goods with water as they are loaded.
SS (SSS)	all microprocessor-controlled models	seconds, i.e., “SS” means two digits (00-99 seconds), “SSS” means three digits (000-255 seconds); see also **MMQ**.
Standard C-Bit	CBW® washer	see **C-Bit, Standard**

Term	Applies to these machines	Definition
Standard Input	CBW® washer	see **Input, Standard**
Standard Output	CBW® washer	signal from the microprocessor control to perform a certain standard function—such as "Start Motors on Odd Modules First."
Standing Bath	CBW® washer	condition where there is no counterflow in a module.
Steam Code	CBW® washer	see **C-Bit Steam Code**
Step Timer	CBW® washer; Dryer	counts time for each individual step in a formula or dry code.
Supply Injector	washer-extractor	compartmented hopper into which chemicals are loaded before beginning a wash cycle; these chemicals are flushed into the machine automatically when commanded by the control.
Synchronism	CBW® system	condition where the movement of batches of goods through some part of the overall processing operation exactly corresponds with the tunnel transfers; batches discharged from the tunnel may remain synchronous only at the very moment of transfer.
TDC	CBW® washer	top dead center; the approximate position of the junction of the transfer scoops and the perforated cylinder side sheets after transfer has occurred.
TDCLS	CBW® washer	top dead center limit switch; see also **CCWLS**, **CWLS**, and **SAFETY**.
Thermistor	CBW® system	temperature-sensing device that varies its resistance to an electrical current with regard to temperature; used most frequently in CBW® washers, washer-extractors, and dye machines.
Thermocouple	Dryer	temperature-sensing device that provides a millivolt range current which varies proportionally according to its temperature; used most frequently in dryers.
Three Wire Circuit	all models	circuit that provides control power for all machine functions; any of several safety devices in the three-wire circuit will open the circuit and stop machine operation if a malfunction is detected; once open, the three-wire circuit can only be closed by manual intervention and then only if the condition that opened the circuit is rectified.
Thermo-Water	all models so equipped	method of controlling incoming water temperature by modulating (alternately and oppositely opening and closing) the hot and cold water valves.
Timer, Output	CBW® washer	software process that controls or monitors the duration of a function. See also **C-Bit Value, On-time**.

Term	Applies to these machines	Definition
Toggle Switch	all models	one of several types of hand-operated switches with a single operating lever that can be moved to two or more positions (e.g., the Master switch).
Transfer Time (Formula Transfer Rate)	CBW® washer	commanded time between transfers.
Trickle-Charged	all microprocessor-controlled models	process of slowly and continuously charging a microprocessor backup battery during machine operation to maintain a full charge.
Tumbling	Dryer, washer-extractor	goods are kept moving after the cycle is complete until the operator is ready to discharge them.
Tunnel	CBW® washer	see **Tunnel Washer**
Tunnel Washer	CBW® washer	industry term referring to a continuous batch washer.
VERTSTO	CBW® system	Milnor® multi-tiered, non-translating, elevating or non-elevating intermediate cake storage conveyor for storing pressed cakes between other cake-moving devices in the CBW® system.
Wash Zone Flow Lifter	CBW® washer	see **Flow Lifter**
Washer-extractor	CBW® system	machine that both washes and extracts (spins the goods) to remove a large percentage of the absorbed water.
Watchdog Timer	CBW® washer	one of a number of program timers which causes the Miltron control to initiate a hold if certain portions of the cylinder reversal or transfer sequences exceed programmed limits.
Weir	CBW® washer	device in each tunnel module that controls the level of the liquor as it discharges from the module.
Zone	CBW® washer	group of independent tunnel modules with separate baths in each module, connected together (usually in counterflow) via their overflow weirs, and dedicated to performing specific functions including washing, rinsing, etc.

Section 1

Programming

PROGRAMMING THE M7E, M7V, M9E & M9V EXTRACTOR CONTROL

The Program Menu and How To Access It

The Available Modes in the Program Menu

0=OK TURN KEY TO RUN (permits safe return to Run Mode)
1=ADD/CHANGE FORMULA
2=COPY OLD TO NEW (copy existing formula to unused formula number)
3=CONFIGURE (tells computer which models and options it is controlling)
4=DOWNLOAD (from machine-to-machine or machine-to-tape)
5=CLEAR ALL MEMORY (Voluntarily)
6=DEFAULT FORMULAS

To Access the Program Menu

When the display=

```
WAITING FOR LOAD
```

This is the Run Mode, explained in "RUNNING THE EXTRACTOR IN AUTOMATIC" (see Table of Contents).

Accesses the Program Menu

```
PROGRAM 0 MENU
OK TURN KEY TO RUN
```

Underline indicates cursor position. Select one of six program modes by number or with ↑ or ↓ or select ⏎ before returning to *run mode*.

↑ or ↓ **Scrolls the available program modes.**

or **<x>** **Selects Program Mode x**, where **<x>** is the Program Mode number—example:

```
PROGRAM 1 MENU
ADD/CHANGE FORMULA
```

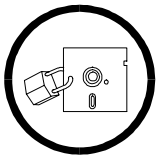
Program Mode 1 selected.

For Safe Return to Run Mode From Program Menu

0	**Selects Program Mode 0 if menu is elsewhere**	PROGRAM 0 MENU OK TURN KEY TO RUN	This display must appear before turning keyswitch to RUN.
, ENTER NEXT	**Causes the control to prompt for cake information** (e.g., "DOES EXTRACTOR HAVE A CAKE?") The correct responses must be provided for proper processing and accounting. See "RUNNING THE EXTRACTOR IN AUTOMATIC."		
<responses>	**Confirms Extractor Cake Data,** where <responses> are as explained in "When Cake Data Must be Confirmed" in "RUNNING . . ."	WAITING FOR LOAD	Extractor ready for normal automatic operation.

With a program selected—example:		PROGRAM 1 MENU ADD/CHANGE FORMULA	Program Mode 1 *selected*.
ENTER NEXT	**Accesses the selected program**	ADD/CHANGE FORMULA 00 FORMULA 00	Program Mode 1 *accessed*. See instructions elsewhere in this section.

⚠ CAUTION ⚠



DATA LOSS HAZARD—Improper use of the Program/Run keyswitch may corrupt program data.

- ☞ **Return to run mode only when the display says IO Turn Key to Run**
- ☞ **Only power off or on with the Program/Run keyswitch at run.**
- ☞ **Do not leave key accessible to unauthorized personnel.**

NOTE: If you suspect program data is corrupt or the display says *Clear Memory Now*, see the *Clear Memory Now* explanation in "M7E, M7V, M9E, & M9V EXTRACTOR ERROR MESSAGES."

1=ADD/CHANGE FORMULA

When the display=

```
PROGRAM 1 MENU
ADD/CHANGE FORMULA
```

ENTER/NEXT =

```
ADD/CHANGE FORMULA
00 FORMULA 00
```

If selected formula doesn't yet exist, "ADD" blinks; if it does, "CHANGE" blinks.

To Access a Formula

0, 5 MNO — **Selects Formula 5**(example)

```
ADD/CHANGE FORMULA
05 FORMULA 05
```

Formulas 00-15 are available for programming.

ENTER/NEXT — **Accesses the formula name**

```
F05 FORMULA NAME
FORMULA 05
```

Keep the default name "FORMULA 05" or enter any other name (up to 10 characters).

To Name the Formula

ENTER/NEXT — **Names the formula the same as the formula number, or**

1 ABC*, ↑, 5 MNO, ↑, 7 STU, ↑, 7 STU, ↑, 5 MNO, ↑, 5 MNO **enters "COTTON" (example)**

***Example: Press 1 ABC three times or hold it to scroll until "C" appears.**

```
ADD/CHANGE FORMULA
F05 COTTON
```

0 — **Displays a blank screen.**

↑ / ↓ — **Moves cursor right/left.**

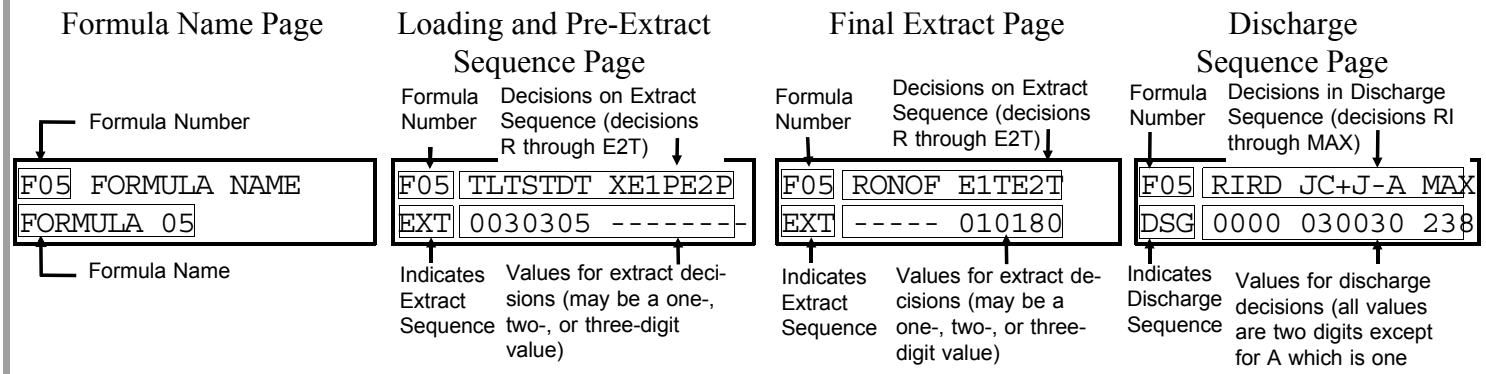
ENTER/NEXT — **Accepts the formula name and advances to the next display**

```
F05 TLTSTDT XE1PE2P
EXT 0000000000000000
```

This is the Extract Sequence page explained in "To Move Cursor Backward/Forward in Formula Programming" in this section.

To Move Cursor Backward/Forward in Formula Programming

Each formula has three successive pages: the Formula Name, the Extract (EXT) Sequence, and the Discharge (DSG) Sequence.


Formula Name Page
Loading and Pre-Extract Sequence Page
Final Extract Page
Discharge Sequence Page
Formula Number
F05 FORMULA NAME
FORMULA 05
Formula Name
Formula Number
Decisions on Extract Sequence (decisions R through E2T)
F05 TLTSTDT XE1PE2P
EXT 0030305 -------
Indicates Extract Sequence
Values for extract decisions (may be a one-, two-, or three-digit value)
Formula Number
Decisions on Extract Sequence (decisions R through E2T)
F05 RONOF E1TE2T
EXT ----- 010180
Indicates Extract Sequence
Values for extract decisions (may be a one-, two-, or three-digit value)
Formula Number
Decisions in Discharge Sequence (decisions RI through MAX)
F05 RIRD JC+J-A MAX
DSG 0000 030030 238
Indicates Discharge Sequence
Values for discharge decisions (all values are two digits except for A which is one

If either the Extract Sequence or the Discharge Sequence is displayed,

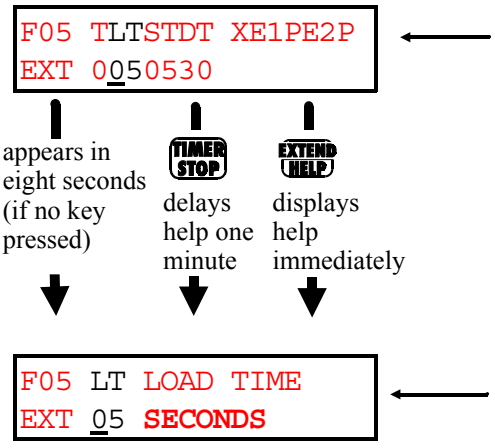
↓ **Moves the cursor backward among the four displays and through each decision.**

↑, ENTER/NEXT **Moves the cursor forward among the three displays and through each decision.** If the cursor is at Decision **A or X**, it will only advance with ENTER/NEXT.

Indicates Extract Sequence

How the Formula Programming Help Screens Work

Each decision has a help screen.


F05 TLTSTDT XE1PE2P
EXT 0050530
appears in eight seconds (if no key pressed)
TIMER/STOP delays help one minute
EXTEND/HELP displays help immediately
F05 LT LOAD TIME
EXT 05 SECONDS

Extract Sequence page, with cursor at Decision LT=*Load Time*. Any valid entry or ↑ or ENTER/NEXT advances the cursor to the next decision. When the cursor advances past the last decision on this page, a new page (Discharge Sequence page) appears for the remaining decisions in this formula.

Help display for Decision LT=Load Time. When any help screen is displayed, values for the displayed decision may be entered, but will not automatically advance to the next decision. ENTER/NEXT **accepts the displayed value and advances to the next decision.**

The Decisions When Programming an Extract Sequence

Loading and Pre-Extract Sequence

```
F05 TLTSTDT XE1PE2P
EXT x
```

T=Type of Extract
0=Standard Extract—Use for most types of goods.
1=Pre + Final Extract—1 to 3 low speed pre-extract each followed by a stop and jog to dislodge the cake followed by a final low plus high speed extract.
2=Final/Final Extract(split)—1 to 3 low speed and high speed extracts each followed by a stop and jog to dislodge the cake, followed by a final low plus high speed extract.

```
F05 TLTWTDT XE1PE2P
EXT  xx
```

Goods are transferred into the extractor with the cylinder turning at drain speed to help pull in the goods.

LT=Load Time—Duration of loading speed during loading, in seconds
03=3 seconds (minimum and default value)
10=10 seconds (example)
99=99 seconds (maximum)

```
F05 TLTSTDT XE1PE2P
EXT    xx
```

ST=Slow Speed Time—Duration of slow speed before distribution, in seconds
00=Basket turns in drain speed during the loading cycle. Wash speed never comes on.
03=3 seconds (minimum and default value)
10=10 seconds (example)
99=99 seconds (maximum)

```
F05 TLTWTDT XE1PE2P
EXT      xx
```

DT=Distribution Time—Duration of distribution, in seconds
05=5 seconds (minimum and default value)
30=30 seconds (example)
99=99 seconds (maximum)

```
F05 TLTWTDT XE1PE2P
EXT         x
```

When the time commanded in MAX expires, the extract ends.

X=Number of Pre-Extract Sequences—Number of times first pre-extract sequence repeats before proceeding to final extract sequence (applies to T=1 and T=2 extract only). Control skips this decision when T=0.
1=1 pre-extract sequence (minimum and default value for Pre+Final or Final/Final extract)
3=3 first extract sequences (maximum value)

```
F05 TLTSTDT XE1PE2P
EXT          xxx
```

E1P=Duration of E1 in Pre-Extract, in seconds—Duration of low speed extract in the Pre-extract sequence before proceeding to the redistribution sequence if T=1 or to the high speed extract if T=2. Control skips this decision if T=0.
010=10 seconds (minimum and default)
180=180 seconds (maximum)

```
F05 TLTSTDT XE1PE2P
EXT             xxx
```

E2P=Duartion of E2 in Pre-Extract sequence (if any) in seconds—Duration of high speed extract in Pre-extract sequence before proceeding to the redistribution if T=2. Control skips this decision if T=0 or T=1.
030=30 seconds (minimum and default)
180=180 seconds (maximum)

Final Extract Sequence

```
F05 RONOF E1TE2T
EXT x
```

R=Reversal Sets—Number of jog reversals after the Pre-Extract sequence (if T=1 or T=2) for Pre+Final or Final/Final extract. Control skips this decision if T=0.
1=1 reversal (minimum and default value)
9=9 reversals (maximum value)

```
F05 RONOF E1TE2T
EXT  xx
```

ON=Reversal Slow Speed On Time, in seconds—Duration of wash speed in clockwise or counterclockwise direction (if T=1 or T=2) during the jog reversal of the redistribution sequence. control skips this decision if T=0.
01=1 second (minimum and default)
99=99 seconds (maximum)

```
F05 RONOF E1TE2T
EXT    xx
```

OF=Reversal slow Speed Off Time, in seconds—Duration of dwell between clockwise and counterclockwise direction (if T=1 or T=2 only) during the jog reversal of the redistribution sequence. control skips this decision if T=0.
01=1 seconds (minimum and default)
99=99seconds (maximum)

```
F05 RONOF E1TE2T
EXT       xxx
```

E1T=Duration of E1 in Last Extract Sequence, in seconds—Duration of the last low speed extract in the last extract before proceeding to the last high speed extract.
010=10 seconds (minimum and default)
180=180seconds (maximum)

```
F05 RONOF E1TE2T
EXT          xxx
```

E2T=Duration of E2 in Last Extract Sequence, in seconds—Duration of the high speed extract in the last extract before proceeding the Discharge Sequence.
030=30 seconds (minimum and default)
600=600 seconds (maximum)

The following two decisions apply to single motor machines only.

```
F05 RONOF E1T E2T LH
EXT               x
```

L=Low Extract Speed—Enter desired low extract speed - 1 (lowest) to 4 (highest). RPMs for the four possible speeds are provided in the product brochure.

```
F05 RONOF E1T E2T LH
EXT               x
```

H= High Extract Speed—Enter desired high extract speed - 1 (lowest) to 4 (highest). Note: H must be greater than or equal to L. RPMs for the four possible speeds are provided in the product brochure.

The Decisions When Programming a Discharge Sequence

```
F05 RIRD JC+J-A MAX
DSG xx
```

RI time applies only to machines with inflatable ribs. It is the time allocated to inflate the ribs after the Speed switch closes.

RI=Rib Inflation—Duration of delay to inflate ribs in seconds.
00=0 seconds (minimum and default value). Use this value if machine does not have inflatable ribs.
15=15 seconds (example)
40=40 seconds (maximum)

```
F05 RIRD JC+J-A MAX
DSG   xx
```

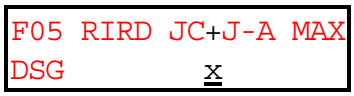
RD time applies only to machines with inflatable ribs. It is the time allocated to deflate the ribs before jogging begins. If A=0 (see below), RD occurs after tilt up. If A=1, RD occurs before tilt up. Provide sufficient time for the ribs (if so equipped) to deflate.

RD=Rib Deflation—Duration of delay to deflate ribs in seconds.
00=0 seconds (minimum and default value). Use this value if machine does not have inflatable ribs.
15=15 seconds (example)
60=60 seconds (maximum)

```
F05 RIRD JC+J-A MAX
DSG      xx
```

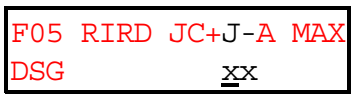
One reversal=Clockwise (CW) Jog Run Time + Jog Stop Time + counterclockwise (CCW) Jog Run Time + Jog Stop Time. If A=0, jogging occurs after tilt up. If A=1, jogging occurs both before and after tilt up.

JC=Jog Reversals—Number of sets of reversals during discharge.
01=1 reversal (minimum and default value—control will not permit entering 00)
04=4 reversals (example)
20=20 reversals (maximum)



If +=0 enables the special jogging motion. This is useful for dislodging tightly plastered goods.

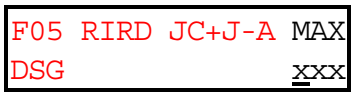
+=Special Jogs (or Jog Run Time if + ≥ 1)—Duration of slow motor Run during CW or CCW rotation.
0=Special jogging feature (minimum and default). If +=0, Brake remains applied, and Run and Stop times each become 1/3 seconds. Jog Counts in (J-) command twice the number of CW and CCW directions (sets of reversals). See explanation under (J-).
1=1 second (minimum for Jog Run time)
9=9seconds (maximum)



If +=0, then J- is how many times the cylinder jogs when +=0 and J-=1 basket jogs twice in each direction and dwells one second before reversing. For J-=2, basket jogs four times in each direction; J-=3 for six times, etc. If + ≥ 1, J- commands the Jog Stop time. In either case, use JC to command total sets of reversals.

J-=Jog Stop Time—Duration of slow motor OFF at each pause during a reversal, in seconds.
01=1 second (minimum and default value)
99=99 (maximum)
10=10 inch count if +=0 (maximum)

A=Tilt after Jog (yes or no)—Causes Jog sequence to occur before and after tilting.
0=No (default)
1=Yes. When Ribs Inflate (RI) and Ribs Deflate time (RD) expire, machine jogs per JC, +, and J-, then tilts up and repeats the jog sequence. If the goods tend to dislodge in slabs too large to exit the machine, use this feature to separate the slabs before the machine tilts up.



MAX=Estimated Total Cycle time, in seconds—Displays the Estimated Total Cycle time. It may be used to lengthen the last high speed extract time when the time available for the total extract cycle is greater than the Estimated Total Cycle time. As each formula decision is entered, the control will automatically calculate the cumulative time required (including estimate for braking, jogging, etc.) When there is one extractor behind the tunnel, the theoretical time available for the Total Extract Cycle is the same as the time between tunnel transfers; three extractors, three times; and so on. To view an interim or partial Estimated Cycle time, press <SKIP TO> key anytime during programming. The control will not accept a value less than the Estimated Total Cycle time. To extend the last high speed extract time, enter a MAX value greater than the Estimated Minimum time. For example, if the Estimated Total Cycle time is 155 seconds, enter 185 seconds to lengthen the last high speed extract time by 30 seconds or enter 155 to accept the previously commanded E2 time, etc. See "HOW EARLY CALL WORKS" in the reference manual for how feature influences how long the centrifugal may continue to extract after the Estimated Minimum time has been satisifed.
999=999 seconds (maximum)
*****=Estimated Total Cycle time exceeds 999 seconds

2=COPY OLD TO NEW

When the display=

```
PROGRAM 2 MENU
COPY OLD TO NEW
```

ENTER/NEXT =

```
COPY SOURCE
00
```

↑ or ↓ **Scrolls the existing formula numbers.**

or **<xx>** **Selects formula to be copied** where <xx> is the formula number (e.g., 05).

If this formula does not exist, display=

```
COPY SOURCE
05 DOES NOT EXIST
```

This display remains on the screen, permitting any other formula number to be entered.

If this formula does exist, display=

```
COPY SOURCE
05 SHIRTS
```

(example)

ENTER/NEXT **Accepts the selected source formula and displays**

```
COPY DESTINATION
00
```

↑ or ↓ **Scrolls the unused formula numbers.**

or **<xx>** **Selects formula to be created** where <xx> is the formula number (e.g., 12).

If this formula already exists, display=

```
COPY DESTINATION
12 ALREADY EXISTS
```

This display remains on the screen, permitting any other formula number to be entered.

If this formula does not exist, display=

```
COPY DESTINATION
12 FORMULA 12
```

The selected existing formula has been copied into the selected, unused formula number, except that the existing formula name was not copied. In the example, the new formula name is *Formula 12.*

ENTER/NEXT = **Copies the formula**

```
PROGRAM 0 MENU
OK TURN KEY TO RUN
```

3=CONFIGURE (and Why It Is Necessary)

Because the microprocessor can control several different models, it is necessary to configure each machine to match its specific model and options (e.g., allied versus Miltrac controller loading/discharge, Mildata® computer, etc.). Such decisions are discrete to the specific machine and must never be changed unless options are later added or removed. However, certain other configure decisions such as belt on and off times may be changed at the user's discretion. The machine is configured at the Milnor® factory and the original configuration shown on the metal configure nameplate affixed to the machine.

⚠ CAUTION ⚠

Configure Data will be lost **if control is powered *off* while in configure mode. At next power up, the control will display *Config Error* and forces reconfiguration. Reconfigure at installation and any time memory is cleared to ensure correct configure codes.**

When the display= | PROGRAM 3 MENU
CONFIGURE | ENTER/NEXT = | LANGUAGE
0=ENGLISH | This is the first configure decision, explained below.

To Move Cursor Backward/Forward in Configure

Each configure decision has its own display containing help information (separate help displays are unnecessary).

↓ **Moves the cursor backward through each configure display, retaining each previously entered value. This display will not back up from Machine Name.**

↑ or ENTER/NEXT **Moves the cursor forward through each configure display, retaining each previously entered value. the control will not automatically advance when a value is entered.**

The Configure Decisions

LANGUAGES
0=ENGLISH

When non-English displays become available, either English or the non-English language specified at time of purchase can be configured.

0=English
1=Foreign

Delay Starting Belt, which follows, is the duration of pause before Belt A (and Belt B, if so equipped) starts running. This pause time allows the goods to "bunch up" before the belts start moving and has two methods of operation, as explained below.

DELAY STARTING BELT
05 SECONDS

METHOD 1: *Delay Starting Belt Time* begins when the *Discharge Sequence Rib Deflation Time (RD)* ends and the cylinder starts jogging to discharge. See "How Belt A and Belt B Work" in this section for an explanation of belt motion resulting from this decision. When *Delay Starting Belt Time*≠99, the extractor waits until transfer is allowed to begin the discharge sequence.

NOTICE

If a long *Delay Starting Belt Time* is configured, this time may exceed the jogging time for formulas with a small number of jog counts and cause a long pause between the end of jogging and the *Delay Starting Belt Time*.

DELAY STARTING BELT
99 UNTIL AFTER JOGS

METHOD 2: *Delay Starting Belt Time* is the duration of jogging. If Belt B is configured, the *Belt On Time* and *Belt Off Time* decisions do not appear. When Belt Delay Time=99, the extractor can begin the discharge sequence before transfer is allowed, thus saving time by permitting goods to discharge onto Belt A while the extractor awaits the ok to discharge.

99=Belt A (and Belt B if so equipped) remains stationary until the jogging sequence is finished (default). Belt A (and Belt B, if so equipped) then run *Belt Clear Time*.

BELT A CLEAR TIME 10 SECONDS

When the cylinder jogging sequence or *Delay Starting Belt Time* ends (whichever is longer), Belt A runs for the duration specified here to ensure all goods have discharged. See "How Belt A and Belt B Work" in this section.

00=0 seconds (minimum and default value)
10=10 seconds (example)
99=99 seconds (maximum)

BELT B INSTALLED 0=NO [1=YES]

Does this extractor have a Belt B? If *0*(*no*) is specified here, the *Belt On Time*, *Belt Off Time*, and *Belt B Clear Time* decisions do not appear.

0=No (default value)
1=Yes

The following two decisions appear only if *Belt B Installed=1*(*yes*) and *Delay Starting Belt Time≠99.*

BELT ON TIME 05 SECONDS

Duration of belt motion, after the *Belt Delay Time*, each time the belts move while the cylinder is jogging to discharge (in seconds). This works in conjunction with *Belt Off Time*. This display only appears if *Belt B Installed=1(yes)*.

00=00 seconds (minimum and Default Value)
05=5 seconds (example)
99=99 seconds (maximum)

The on and off times, which must be determined by field trials, will be those which achieve a fairly uniform dispersal of goods across the entire length of Belt B (i.e., the first piece of goods block the discharge-end photo-eye at about the same time the last piece of goods transfers from Belt A to Belt B).

BELT OFF TIME 02 SECONDS

Duration of belt pause each time the belts stop while the cylinder is jogging to discharge (in seconds). This works in conjunction with *Belt On Time*. This display appears only if *Belt B Installed=1(yes)*.

00=00 seconds (minimum and default value)
02=2 seconds (example)
99=99 seconds (maximum)

The following decision only appears if the *Belt B Installed=1(yes)*.

BELT B CLEAR TIME 20 SECONDS

When allowed to discharge, *Belt B* runs for the duration specified here, to ensure that all goods have discharged. Appears only if *Belt B Installed=1(yes)*.

00=00 seconds (minimum and default value)
20=20 seconds (example)
99=99 seconds (maximum)

ALLIED LOADING 0=NO [1=YES]

Disables/enables allied loading. See "INTERFACING MILNOR® EXTRACTORS WITH ALLIED (NON-MILNOR®) SYSTEMS."

0=No (default value)
1=Yes

ALLIED DISCHARGE 0=NO [1=YES]

Disables/enables allied discharge. See "INTERFACING . . ." This permits the use of outputs to supply processing data, in binary, to allied on relay logic or non-serial post-extractor devices along with handshaking to transfer goods. Requires 3 16/8-input/output boards at address 2H, 3H, and 4H respectively and 1 16-output boards at address 12H.

0=No (default value)
1=Yes

How BELT A and BELT B Work

The extractor incorporates conveyor belts as shown in FIGURE 1. The two belts under the cylinder are together known as "Belt A" and are always supplied. Depending on the overall system design, Belt A will discharge either onto an optional storage belt, known as "Belt B" and supplied as part of the extractor, or it will discharge directly to the receiving device (usually a Milnor® Coloos).

If Belt B is supplied, the extractor can discharge its cylinder when desired onto Belt B, provided Belt B is not loaded, because Belt B is usually designed to store goods. If Belt B is loaded, the extractor must wait for Belt B to discharge its goods before the extractor can discharge the cylinder.

If Belt B is not supplied, the extractor must wait for the receiving device before it can discharge the cylinder, because Belt A is not capable of storing goods.

To control the dispersal of goods on the belts during discharge, the user can specify either no belt motion, stationary followed by continuous motion (until the belt photo-eye is blocked), or stationary followed by intermittent motion (if Belt B is provided). The following table shows how the belt on/off and Belt Delay decisions achieve this.

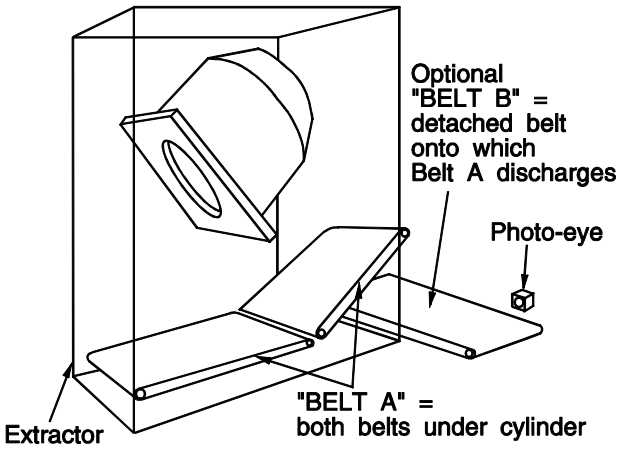


FIGURE 1 (MSOP0904CE)
Extractor Belt Identification

	Belt ON and OFF Times	Belt Delay Time	Belt Motion			
			During Jogging		After Jogging	
			During Belt Delay Time	After Belt Delay Time	During Belt Delay Time	During Belt Clear Time
BELT A (Belt B not furnished)	N/A	≠ 99 (Method 1)	Stationary	Continuous	Stationary	Continuous for Belt A Clear Time
	N/A	= 99 (Method 2)	Stationary		N/A	
BELT A (Belt B furnished)	N/A	≠ 99 (Method 1)	Stationary	Intermittent	Stationary	Continuous for Belt A Clear Time
	N/A	= 99 (Method 2)	Stationary		N/A	
BELT B (if furnished)	Configured	≠ 99 (Method 1)	Stationary	Intermittent[2]	Stationary	See 1, 2, 3, 4
	N/A	= 99 (Method 2)	Stationary		N/A	Continuous for Belt B Clear Time[2,3,4]

1. After jogging is completed, Belt B runs intermittently during any remaining Belt A Clear Time then continuously for Belt B Clear Time.
2. If the Belt B photo-eye blocks, Belt B stops.
3. If the Belt B photo-eye is not blocked within Belt B Clear Time, "photoeye failed" error occurs.
4. If the extractor is configured for allied discharge, Belt B will stop and start each time the photo-eye blocks and subsequently clears (as when goods are manually removed) until it runs for one uninterrupted Belt B Clear Time. At this time, the control declares Belt B empty, preventing it from running again until it receives the next batch of goods.

HOLD UNLOAD DEVICE 0=NO [1=YES]

Applies to certain Miltrac devices only. Should the device that is receiving goods from the extractor (e.g., a shuttle) wait for more than one load (e.g., wait for two 110-lb. loads from the extractor, before conveying these to a 220-lb. capacity dryer)? If so, Hold Unload Device=1(yes). See the Miltrac manual.

ALLIED PASS DATA 0=NO [1=YES]

Only if *Allied Loading* and/or *Allied Discharging=1(yes)*. Tells the extractor that optional boards are required for data (must match hardware provided).

0=No (default value)
1=Yes

MILTRAC ADDRESS 000

If either *Allied Loading* or *Allied Discharging=0(no)*, the extractor is a Miltrac device and this display appears. A discrete, three-digit Miltrac address must be assigned to the extractor. See the Miltrac manual for more information.

000=Lowest and default address
008=Address 008 (example)
255=Highest address

LINK TO MILDATA 0=NO [1=YES]

Will the extractor communicate with a Mildata® computer? If *1(yes)*, the following display appears.

0=No (default value)
1=Yes

MILDATA ADDRESS 001

If *Link to Mildata=1(yes)*, the extractor is a Mildata® device and this display appears. A Mildata® address must be assigned. See the Mildata® manual.

000=Lowest and default address
025=Address 025 (example)
255=Highest address

LOAD CHUTE INSTALLED 0=NO [1=YES]

Does this extractor have a load chute installed? If *0(no)* is selected, the control ignores the *Load Chute Not Up* and *Load Chute Not Down* inputs and does not check for these error conditions. However, the control still utilizes the *Load Chute Blocked* input to check for this error.

LOAD DOOR INSTALLED 0=NO [1=YES]

Does this extractor have a door installed? If 0(no) is selected, the control ignores the *Door Up* and *Door Down* inputs and does not check for these error conditions.

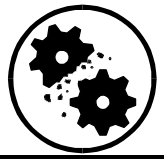
0=No (default value)
1=Yes

CHECK LOAD-EYE AFTER 1 SECONDS

Enter the desired amount of time the controller should monitor the load-end eye input toward the end of each distribution (i.e., entering 05 would cause the controller to begin monitoring in the last 5 seconds of the loading sequence distribution speed or the pre-extract sequence redistribution speed.

1=Lowest value (default)
5=5 seconds (recommended)
9=Highest value

⚠ CAUTION ⚠



Entering 1(yes) to the Store Load on Belt A configure decision will cause the extractor cylinder to tilt, crushing the belt on a normal extractor. Answer 1(yes) only for extractors raised 48 inches over Belt A.

```
STORE LOAD ON BELT A
0 = NO [1 = YES]
```

Applies only to extractors raised 48 inshes over Belt A. Enter *0*(*no*) if the controller should not store goods on Belt A. Enter *1* (*yes*) if the controller should store goods on Belt A because the multiple cake discharge feature in Miltrac is used.

0=No (default value)
1=Yes

NOTE: To enable the multiple cake discharge, the previous *Hold Unload Device* decision must be *1(yes)*.

```
EARLY CALL FOR LOAD
1=YES [0=NO]        0
```

Applies only if using Miltrac. Enter *1*(*yes*) if the extractor should request goods from theloading device after formula minimum time is expired. Enter *0(no)* if the extractor should request goods only after the jog sequence is finished and basket is starting to tilt down.

0=No (default value)
1=Yes

NOTE: To enable the multiple cake discharge, the previous *Hold Unload Device* decision must be *1(yes)*.

```
RUN BELT AFTER LOAD
1=YES [0=NO]        0
```

Enables Belt B for 15 seconds when the machine enters distribution speed. This clears a portion of the belt to avoid discharging a few loose items onto the shuttle and blocking the photo-eye before all goods can be loaded onto the shuttle. Set this decision to *0(no)* if Belt B is installed or a load can be stored on Belt A.

0=No (default value)
1=Yes

```
HOLD BELT B TIL A IS
FULL 0=NO 1=YES     0
```

Applies if using Miltrac with Belt B installed. Enter *1(yes)* if the extractor should transfer to the unloading device after the machine finishes extracting the second batch of goods during a multiple cake discharge.

0=No (default value)
1=Yes

NOTE: To enable the multiple cake discharge, the previous *Hold Unload Device* decision must be *1(yes)*.

```
RECHECK BRAKE PAD IN
01 [0 HOUR 15 MIN]
```

Enter how often (hours: quarter hours) the controller should check the brake shoes. If the brake shoes are bad, the controller will sound an alarm at the interval entered here.

00=Lowest and default value
20=2 hours (example)
93=9 hours and 45 minutes (maximum)

```
MACHINE NAME
M7E EXTRACTOR
```

Enter any name (up to 20 characters) to identify this machine. Use the keypad procedures described in "To Name the Formula" in this section. This name appears on the printouts when Manual Mode 05, Print Data is used.

The following configure decision applies to machines with Mark III, IV, and V controllers only.

```
BYTES IN NETWORK
00,11,24, OR 30    00
```

Enter 00 for Miltrac systems using new Miltrac protocol (Miltrac 89100 and later). Enter bytes in network string (11, 24, or 30) for Miltrac systems using old Miltrac protocol (prior to Miltrac 89100).

4=DOWNLOAD

General Rules for Downloading

1. Valid downloading requires that the sending and receiving machines have identical software versions and that the receiving machine's model and options closely correspond to the sending machine's configuration. The following conditions produce data that is valid for the receiving machine(s) to the extent indicated:

- Downloaded data is fully valid when all the machines have identical software version, and all receiving machines match the sending machine's configuration (model and options). Generally, only minor corrections are required to validate data after downloading; thus, downloading is usually beneficial.
- Identical software version, sending machine's configuration matches receiving machine's model but not its options. Modify configure codes and formulas to suit receiving machine's options.
- Identical software version, but configuration does not match receiving machine's model. Formulas usually require substantial modification to validate the data; thus, downloading is of questionable value.
- Do not download different software versions (results in scrambled, unusable data).

⚠ CAUTION ⚠

Unless all machines have *identical* configurations, after downloading, always reconfigure in accordance with each receiving machine's configuration nameplate. Failure to do so may compromise safety and result in damage to goods or machine.

2. Downloading transfers all formulas and configure codes from one machine (or simulator or PC) to another via a serial communication cable or between a machine and cassette tape via a MILNOR® Cassette Tape Interface. Downloading eliminates the need to enter the same data repeatedly. However, selective downloading (e.g., transferring only certain wash formulas) is not possible.

3. For machine-to-machine transfers where a serial link is not permanently installed (in conduit) between the participating machines, install a temporary cable in accordance with "THE EXTERNAL SERIAL LINK CABLES AND HOW TO CONSTRUCT THEM."

⚠ CAUTION ⚠

Remove *temporary cable* as soon as downloading is completed, to avoid data loss.

4. **Do not use the downloading procedures described in this section with machines that are part of a Miltrac, Milnet®, or Mildata® system unless all system devices except those participating in downloading are turned off.** Download data and system data share the same serial communication line; thus download data can disrupt system operation, and system data can scramble the download data.

NOTE: This restriction does not apply to downloading from a Mildata® computer. See procedures for downloading with a Mildata® computer in the Mildata® manual.

5. Downloading to/from tape requires the Milnor® Cassette Tape Interface. Connect the appropriate lead from the interface box to the Download jack on the machine. Connect the other lead from the interface box to the tape recorder. Set the cassette tape recorder and the Cassette Tape Interface Box as follows:

Type of Transfer	**Toggle Switch on Interface Box**	**Tape Recorder**
machine-to-tape	TO TAPE	1. connector from interface box plugged into microphone jack 2. blank tape loaded, fully rewound
tape-to-machine	TO MACHINE	1. connector from interface box plugged into earphone jack 2. data tape loaded, fully rewound 3. volume control to maximum

6. In the downloading process there may be one or more slave (receiving) machines or one receiving tape recorder and only one master (sending) machine or tape recorder. **Designate all slave (receiving) machines first. If data is transferring between machines, downloading begins as soon as one machine is designated as the master.** If transferring from machine to tape, downloading begins 10 seconds after the machine is designated the master. If transferring from tape to machine, downloading begins when the tape recorder is set to "Play."

7. If data transfer is halted while sending, all receiving devices will contain a mixture of old and new data. **Repeat the download procedure.**

Available Modes in the Download Sub-menu

0=MACHINE <==> MACHINE (copy data from one device (machine or simulator) to another

1=MACHINE <==> TAPE (move data between a machine and a tape recorder)

2=MILDATA <==> MACHINE (not currently used)

When the display=

This is the Download sub-menu.

↑ or ↓ **Scrolls the available download transfer types.**

or 0 **Selects machine-to-machine transfers**

```
DOWN LOAD DEVICES
0 MACHINE<==>MACHINE
```

A machine can be either an extractor or simulator.

or 1 ABC **Selects transfer between machine and tape recorder**

```
DOWN LOAD DEVICES
1 MACHINE<==>TAPE
```

ENTER NEXT **Accepts the selected transfer type**

```
DOWN LOAD STATUS
0 SLAVE
```

0 **Tells the control this machine is receiving (not sending) data. All receiving machines must be designated first.**

or 1 ABC **Tells the control this machine is sending (not receiving) data. The sending machine must be designated last.**

ENTER NEXT **Accepts the selected download status.**

If This Is a Slave (Receiving) Machine

When the display=

```
RECEIVE CONFIG ?
0 NO
```

Since configure codes must be correct for the receiving machine, make the selection that is likely to most closely meet this requirement—usually 0 (do not download configure codes) is best.

0 Specifies that configure codes **will not** download.

or 1 ABC Specifies that configure codes **will** download.

ENTER NEXT **Accepts the selected choice.**

For Quick Exit From Anywhere in Download or To Abort Download

CANCEL ESCAPE **Returns to Program Menu if download process not started**

```
PROGRAM 0 MENU
OK TURN KEY TO RUN
```

or **Aborts the download process** for any receiving machine on which it is commanded, or for all machines if commanded on the sending machine. Repeat the download process for any receiving machines on which downloading was aborted, otherwise the machine will contain a mixture of old and new data.

Display=

```
DOWNLOAD ABORTED
NEXT TO PROCEED
```

If this is a machine-to-machine transfer, display=

```
(S) 9600 BAUD   0000
WAITING FOR MASTER
```

If this is a transfer from tape, display=

```
(S) 0300 BAUD   0000
WAITING FOR MASTER
```

If This Is the Master (Sending) Machine and This Is a Machine-to-Machine Transfer

Downloading has begun.

```
(M)  9600 BAUD XXXX
TRANSFERRING DATA
```

XXXX (scrolling hexadecimal number) indicates the byte location currently downloading. Downloading takes about one minute.

If This Is the Master (Sending) Machine and the Transfer Is to Tape

Ten-second countdown begins.

```
DOWN LOAD STATUS
1 MASTER
```

XX = seconds counting down. Prepare to begin recording.

Press "record" when count xx (above)=02.

```
(M) 0300 BAUD   XXXX
TRANSFERRING DATA
```

XXXX (scrolling hexadecimal number) indicates the byte location currently downloading. Downloading may take more than 10 minutes. MARK TAPE WITH MACHINE MODEL AND SOFTWARE VERSION.

If This Is a Transfer From Tape to Machine(s) and All Slave (Receiving) Machines Are "Waiting for Master"

Turn volume up full on the recorder then press "play" to begin downloading.

During downloading, receiving machine(s) should display the following:

(S) 0300 BAUD *XXXX* RECEIVING DATA	or	(S) 9600 BAUD *XXXX* RECEIVING DATA	*XXXX* (scrolling hexadecimal number) indicates byte location currently downloading.

If during downloading, any receiving machines display the following, downloading was unsuccessful:

(S) 0300 BAUD 000 WAITING FOR MASTER	or	(S) 9600 BAUD 000 WAITING FOR MASTER	or	ERROR IN CHECKSUM NEXT TO PROCEED

Repeat the download process.

Display=

```
DOWN LOAD ABORTED
  NEXT TO PROCEED
```

When downloading is successfully completed,

all displays=

```
PROCESS COMPLETED
 NEXT TO PROCEED
```

ENTER NEXT **Returns to Program Menu**

```
PROGRAM  0  MENU
OK TURN KEY TO RUN
```

Each device in the data transfer requires this command.

5=CLEAR ALL MEMORY (Voluntarily)

When the display=

PROGRAM 5 MENU	
CLEAR ALL MEMORY	

ENTER/NEXT =

4+5+6=CLEAR MEMORY	
CANCEL = ESCAPE	

No cursor appears.

CANCEL/ESCAPE **Exits this program without clearing memory.**

4 JKL + 5 MNO + 6 PQR **Clears all formulas.** Configure codes are unaffected when memory is cleared voluntarily, but the control must be reconfigured after first commissioning the machine or when the display says "CONFIG ERROR."

6=DEFAULT FORMULAS

When the display=

PROGRAM 7 MENU	
DEFAULT FORMULAS	

ENTER/NEXT =

DEFAULT FORMULAS	
0 = NO [1 = YES] 0	

No cursor appears.

0, ENTER/NEXT **Ignores this mode.**

1 ABC, ENTER/NEXT **Accepts up to six preset formulas into protected memory.** This deletes all 16 formulas replacing formulas 00-05 with the six standard formulas and replaces formulas 06-15 with blank formulas.

Formula 00: Polycotton
Formula 01: Cotton
Formula 02: Small Cotton
Formula 03: Mat Single
Formula 04: Mat Double
Formula 05: Mop Heads

CANCEL/ESCAPE **Return to the Program Menu**

PROGRAM 0 MENU
OK TURN KEY TO RUN

P E L L E R I N M I L N O R C O R P O R A T I O N

M7E: M7E-42ALR 59436-95 **VERSION:** 95105AS **DATE:** 01/18/2000 **PAGE:** 01

FORMULAS

T =TYPE OF EXTRACT
LT =LOADING TIME
ST =SLOW SPEED TIME
DT =DISTRIBUTION TIME
X =NUMBER OF PRE-EXTRACTS
E1P=E1 PRE-EXTRACT TIME
E2P=E2 PRE-EXTRACT TIME
R =REVERSALS AFTER PRE-EXTS.
ON =SLOW SPEED ON TIME
OF =SLOW SPEED OFF TIME
E1T=FINAL E1 TIME
E2T=FINAL E2 TIME
L =LOW EXTRACT SPEED
H = HIGH EXTRACT SPEED

RI =RIB INFLATION TIME
RD =RIB DEFLATION TIME

JC =SET OF JOG REVERSALS
+ =JOG RUN TIME
(SPECIAL JOGS WHEN +=0)
J- =JOG STOP TIME
(INCH COUNTS WHEN + = 0)
A =TILT AFTER JOG
MAX=ESTIMATED TOTAL CYCLE TIME
(INCLUDING RECEIVE+DISCHARGE TIMES)
*** MAX TIME EXCEEDS 999 SECONDS
NOTE: ALL TIMES IN SECONDS

Applies to single motor machines only

F00 POLYCOTTON	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=STANDARD	0	10	03	15	-	---	---	-	--	--	015	090	24	00	00	03	1	01	0	155
F01 COTTON	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=STANDARD	0	15	03	15	-	---	---	-	--	--	015	120	24	15	05	05	1	01	0	218
F02 SMALL COTT	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=PRE+FINAL	1	10	03	15	1	045	---	1	02	02	015	105	24	15	15	05	1	01	1	335
F03 MAT SINGLE	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=STANDARD	0	10	03	15	-	---	---	-	--	--	015	090	24	00	00	03	1	01	0	155
F04 MAT DOUBLE	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=FINAL/FINAL	2	15	03	15	1	015	030	1	02	02	015	045	24	00	00	03	1	01	0	218
F05 MOP HEADS	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=PRE+FINAL	1	10	03	15	1	045	---	1	02	02	015	105	24	15	15	05	1	01	1	335
F06 FORMULA 06	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=********	0	03	00	05	-	---	---	-	--	--	010	000	24	00	00	03	0	03	1	055
F07 FORMULA 07	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=********	0	03	00	05	-	---	---	-	--	--	010	000	24	00	00	03	0	03	1	055
F08 FORMULA 08	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=********	0	03	00	05	-	---	---	-	--	--	010	000	24	00	00	03	0	03	1	055
F09 FORMULA 09	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=********	0	03	00	05	-	---	---	-	--	--	010	000	24	00	00	03	0	03	1	055
F10 FORMULA 10	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=********	0	03	00	05	-	---	---	-	--	--	010	000	24	00	00	03	0	03	1	055
F11 FORMULA 11	**T**	**LT**	**ST**	**DT**	**X**	**E1P**	**E2P**	**R**	**ON**	**OF**	**E1T**	**E2T**	**LH**	**RI**	**RD**	**JC**	**+**	**J-**	**A**	**MAX**
EXT T=********	0	03	00	05	-	---	---	-	--	--	010	000	24	00	00	03	0	03	1	055

FIGURE 2 (MSOP0904AE)

P E L L E R I N M I L N O R C O R P O R A T I O N

M7E: M7E-42ALR 59436-95 **VERSION:** 95105AS **DATE:** 01/18/2000 **PAGE:** 01

CONFIGURE

A.	**LANGUAGES**	: 0=ENGLISH
B.	**DELAY STARTING BELTS**	: 00 SECONDS
C.	**BELT A CLEAR TIME**	: 10 SECONDS
D.	**BELT B INSTALLED**	: 0=NO
E.	**BELT ON TIME**	: NOT APPLICABLE
F.	**BELT OFF TIME**	: NOT APPLICABLE
G.	**BELT B CLEAR TIME**	: NOT APPLICABLE
H.	**ALLIED LOADING**	: 1=YES
I.	**ALLIED DISCHARGE**	: 1=YES
J.	**HOLD UNLOAD DEVICE**	: NOT APPLICABLE
K.	**ALLIED PASS DATA**	: 1=YES
L.	**MILTRAC ADDRESS**	: NOT APPLICABLE
M.	**LINK TO MILDATA**	: 0=NO
N.	**MILDATA ADDRESS**	: NOT APPLICABLE
O.	**LOAD CHUTE INSTALLED**	: 0=NO
P.	**LOAD DOOR INSTALLED**	: 1=YES
Q.	**CHECK LOAD EYE AFTER**	: 5 SECONDS
R.	**STORE LOAD ON BELT A**	: NOT APPLICABLE
S.	**EARLY CALL FOR LOAD**	: NOT APPLICABLE
T.	**RUN BELT AFTER LOAD**	: 0=NO
U.	**HOLD BELT B TIL A IS FULL**	: 0=NO OR NOT APPLICABLE
T.	**RECHECK BRAKE PAD IN**	: 10=1 HOUR 00 MINS
W.	**MACHINE NAME**	: M7E42ALR 59436-95

FIGURE 3 (MSOP0904AE)
Sample Printout—Configuration

Section 2

Operating

RUNNING THE EXTRACTOR IN AUTOMATIC

⚠ WARNING ⚠

CRUSHING AND ENTANGLEMENT HAZARDS—When the extractor is operating automatically, it will tilt up/down, drive motors will run/stop, conveyors will run/stop, and other devices will move automatically and without warning. Verify all machine guards are in place and there is no possibility of personnel entering or reaching into the machine. *Emergency Stop switches* on extractor and pull cords on conveyor(s) will stop the machine.

Normal Automatic Operation

The extractor's normal operating mode is fully automatic. Once set for automatic operation, a new batch (and its batch codes) passes from the loading device (e.g., the Milnor® batch washer) to the extractor each time the batch washer transfers. Before each transfer, the just-extracted goods discharge onto a conveyor (thus, freeing the extractor cylinder for the next batch) and eventually to a dryer or other post-wash device.

The Power Up Sequence

Master switch on

Energizes control power, but not extractor power. Operator alarm sounds (until *Start button* is pressed) and the power up displays appear, as shown at right.

COPYRIGHT PELLERIN MILNOR 1991	Copyright statement (appears one or more times)
ALL RIGHTS RESERVED M7E-EXTRACTOR 92000	Number at lower right is software date code.
FORMULA CHECKSUM 0051	This number changes if formula changes are made.

The display then prompts

DOES EXTRACTOR HAVE A CAKE 0=NO 1=YES 0	Default=0 (*no*). If goods remain in Extractor or on Belt A, see "Interruptions . . . " in this section.

ENTER NEXT

If extractor is configured for Belt B, the display prompts

DOES CONVEYOR HAVE A CAKE 0=NO 1=YES 0	Default=0 (*no*). If goods remain on Belt B, see "Interruptions. . . . "

ENTER NEXT

Displays

THREE WIRE DISABLED	

①

Energizes extractor power and silences operator alarm.

WAITING FOR LOAD	Extractor set for automatic operation.

The Displays During Normal Operation

NOTE 1: All counters displayed during normal operation are in MM:SS (minutes:seconds) format.

NOTE 2: When two or more extractors are served by a shuttle loading device (e.g., Milnor® Cobuc), load-end flags (targets) are located on the shuttle rail in front of each extractor. These flags stop the loading device at the next extractor to be loaded. For Miltrac systems, the flag deploys when the Miltrac control requests "get ready to receive" (prior to "start transfer"); it retracts as soon after the Cycle Start input is made, and the Miltrac control requests "do nothing" (transfer sequence completed). For allied loading, the flag deploys when the Loading Allowed input is made and retracts 10 seconds after the Cycle Start input is made.

NOTE 3: The extractor always utilizes the Cycle Start input (independent of Miltrac) to guarantee that the cycle begins (cylinder turns at distribution speed) as goods enter the cylinder.

While the extractor is idle

```
WAITING FOR LOAD
```

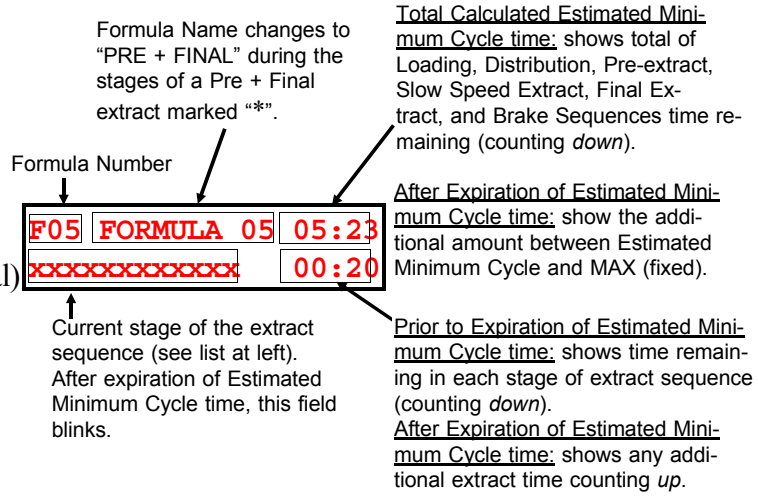
When Miltrac requests "start transfer" or when the extractor closes the load allowed output to tell an allied loading device to discharge

```
WAITING TO LOAD
GOODS INTO EXTRACTOR
```

Cylinder turns at wash speed.

During Loading and Extract Sequence (example)

Stages of a Standard Extract Sequence	Stages of a Pre-Extract or Final Extract Sequence
LOADING SPEED	LOADING SPEED
SLOW SPEED	SLOW SPEED
DISTRIBUTION	DISTRIBUTION
LOW EXT SPEED	LOW EXT SPEED
HIGH EXT SPEED	HIGH EXT SPEED (Final/Final) (BRAKING)
	SLOW REVERSE (alternates CCW and CW direction)*
	DISTRIBUTION*
	LOW EXT SPEED
	HIGH EXT SPEED


Formula Name changes to "PRE + FINAL" during the stages of a Pre + Final extract marked "*".
Total Calculated Estimated Minimum Cycle time: shows total of Loading, Distribution, Pre-extract, Slow Speed Extract, Final Extract, and Brake Sequences time remaining (counting down).
Formula Number
F05 FORMULA 05 05:23
xxxxxxxxxxxxx 00:20
After Expiration of Estimated Minimum Cycle time: show the additional amount between Estimated Minimum Cycle and MAX (fixed).
Current stage of the extract sequence (see list at left). After expiration of Estimated Minimum Cycle time, this field blinks.
Prior to Expiration of Estimated Minimum Cycle time: shows time remaining in each stage of extract sequence (counting down).
After Expiration of Estimated Minimum Cycle time: shows any additional extract time counting up.

If an out-of-balance closes the excursion switch

```
EXCURSION EXCEEDED
   **PLEASE WAIT**
```

Cylinder slows, redistributes, then proceeds to extract.

During Transition to Discharge Sequence

```
BRAKING
SPEED SWITCH OPEN
```

For the time commanded to inflate the ribs (if extractor so equipped) (example)

```
F05 FORMULA 05
RIB INFLATION 00:30
```

Begins when speed switch closes.

While waiting for receiving device, if *Delay Starting Belt Time*≠99 (example)

Maximum wait time=99:59.

While tilting up

For the time commanded to deflate the ribs (if extractor so equipped) (example)

Begins when cylinder reaches full up.

During the Discharge Sequence

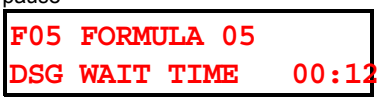
While jogging (example)

The number of jogs for this formula counting down

Time remaining for this jog

Alternates Run and Stop to show cylinder turning and pause

While waiting for receiving device, if *Delay Starting Belt Time*=99 (example)



Maximum wait time=99:59

After jogging (example) Ribs inflate after the last jog reversal to release caught goods.

Alternates between Run and Stop to show belt movement if Delay Starting Belt Time≠99

Time remaining for belt On or Off time (Belt A clear time)

When *Belt A Clear Time* expires, while tilting down

NOTE: When two or more extractors are served by a shuttle receiving device (e.g., Milnor® COLOOS) discharge end flags (targets) are located on the shuttle rail behind each extractor to stop the receiving device at the next extractor to be discharged. For Miltrac systems, the flag deploys when the Miltrac control requests "get ready to discharge" (all conditions for discharge satisfied). For allied discharge, the flag deploys when the Discharge Allowed input is made. Flag retracts at the end of the discharge sequence.

How Early Call Works

Early Call is a software feature which causes the extractor to issue a "desire to load" or "desire to discharge" message ahead of time to ensure the expedient transfer of goods. Early Call in the extractor applies to receiving and discharging and works with both the Miltrac system and with allied devices (if the allied devices provide the necessary inputs, outputs, and control logic).

Receiving—The extractor "desires to load" when the Estimated Minimum Cycle time reaches zero and *Early Call for Load=1 (yes)*. If the extractor is told that a load has been committed to it for transfer, the control will end the extract cycle in progress. As soon as the extractor has finished discharging and returned to the loading position, it will ask for the transfer to take place.

In some systems (e.g., where the extractor is loaded directly by a tunnel), Early Call requires that the extract cycle ends before the next load to enter the extractor has been committed for transfer. The extractor's End Extract input provides this capability. When this input is closed and the Estimated Minimum Cycle time for the extract formula in progress reaches zero, the extractor will end the extract cycle, permitting the extractor to discharge and return to the loading position in time to avoid a "no transfer" *hold* condition in the tunnel. The tunnel controller must close the End Extract input before the tunnel is committed to transfer.

Discharging—If the commanded RI (Inflate Ribs) for the extract formula in progress is zero, the extractor "desires to discharge" when the extract cycle ends and the extractor cylinder starts slowing (braking). If the commanded RI (Inflate Ribs) is not zero, the extractor "desires to discharge" when RI (Inflate Ribs) counts down to zero. If the extractor has Belt B, then it is independent of RI and will try to discharge immediately.

Interruptions in Normal Extractor Operation

Holds Ahead of the Extractor—Anytime the flow of goods into the extractor stops (e.g., if there is a *hold* condition in the tunnel), the extractor remains at *Waiting For Load*. Whenever the flow of goods resumes, processing continues without manual intervention.

Holds Behind the Extractor—Anytime the extractor desires to discharge but cannot because the device to which the extractor sends its goods (e.g., Belt B, shuttle) is not ready to receive, the extractor takes one of four possible actions, depending on the *Jog Before Tilt (A) programming decision* and the *Delay Starting Belt Time configure decision.* These actions are as follows:

Jog Before Tilt (A)	Belt Delay Time	Sequence of Actions
0	≠99	Tilt up— wait for receiving device— rib inflation— jog and run belt(s)*
0	=99	Tilt up—rib inflation— jog— wait for receiving device— run belt(s)
1	≠99	Rib Inflation— jog— tilt up—jog and run belt(s)*
1	=99	Rib Inflation— jog— tilt up— jog— wait for receiving device— run belt(s)

*See"How Belt A and Belt B Work" (see Table of Contents)

In all four cases above, normal processing resumes without manual intervention, as soon as the extractor's receiving device is available.

Power Loss or Three-Wire Disabled Condition—If the extractor either loses power or the three-wire circuit drops out (e.g., if a *Stop switch* is pressed), the extractor stops immediately. The extractor can easily be returned to automatic operation regardless of how long it was stopped or what portion of the cycle it was in when it stopped.

It is not necessary to use the manual mode to load or unload the extractor merely to return it "on-line." It will resume normal automatic operation and synchronize with its interfacing devices (e.g., Miltrac, shuttle) automatically once a power restoration sequence (explained in this section) is completed.

The Power Restoration Sequences

The extractor will execute one of three possible sequences to return on-line, depending on which of the following conditions occurred:

- Power was lost during any portion of the cycle other than extract.
- Power was lost during extract.
- Three-wire circuit was disabled without power loss.

If Power Was Lost Other Than During Extract—Powering up is as described in "The Power Up Sequence" in this section.

If Power Was Lost During Extract

Master switch on (or power restored) — **Energizes control power, but not extractor power.** Operator alarm sounds (until *Start button* is pressed).

```
POWER OFF IN EXTRACT
20 SECONDS DELAY..XX
```

Where XX represents the seconds counting down from 20.

① — **Closes three-wire circuit and silences the operator alarm.**

If cylinder is spinning, holding the speed switch open, display=

```
SPEED SWITCH OPEN
```

If display remains, see "TROUBLESHOOTING" (see Table of Contents).

Once speed switch closes (example)

```
FORMULA CHECKSUM
0051
```

The display then prompts if load door installed.

```
OPEN THE DOOR?
0=NO [1=YES]
```

0=No
1=Yes

The display then prompts

```
DOES EXTRACTOR HAVE
A CAKE 0=NO 1=YES 0
```

<responses> — **Confirms the extractor cake data** where <responses> are as explained in "When Cake Data Must Be Confirmed" in this section. Machine returns to automatic operation.

If the cylinder was *not* commanded to discharge, cycle begins with loading speed. Display=

```
F05 FORMULA 05  02:06
xxxxxxxxx       00:35
```

See explanation of extract sequence display.

Displays during transition to discharge sequence and during discharge sequence are the same as for a normal cycle. If the cylinder was commanded to discharge, cycle skips to RI (inflate Ribs).

If the Three-Wire Circuit Was Disabled Without Power Loss

① **Closes the three-wire circuit and silences operator alarm.**

```
3-WIRE RECOVERY
   **PLEASE WAIT**
```

Basket slows (if spinning) and clutch engages (if speed switch closed). If any other display appears, see "TROUBLESHOOTING."

If speed switch is open, the display=

```
SPEED SWITCH OPEN
```

If this display continues, see "TROUBLESHOOTING."

The display then prompts

```
DOES EXTRACTOR HAVE
A CAKE 0=NO 1=YES 0
```

<responses> **Confirms the extractor cake data** where **<responses>** are as explained in "When Cake Data Must be Confirmed" in this section. Machine returns to automatic operation.

If the cylinder was not commanded to discharge (goods in cylinder require extraction), display=

```
F05 RECYCLE          4:22
xxxxxxxxxx          00:06
```

See explanation of extract sequence display. *Recycle* in place of formula name indicates cycle started over.

Displays that appear during transition to discharge sequence and discharge sequence are the same as for a normal cycle. If the cylinder was commanded to discharge, the cycle skips to RI (Inflate Ribs).

How the Pass-Empty Code Affects Extractor Operation—With the Milnor® tunnel, each wash formula can be assigned an extract formula number which will be passed on to the extractor with each batch. However, any wash formula to which the pass-empty attribute has been assigned (see explanation of post-wash functions in the Display H instructions in the Programming, Operating, and Troubleshooting manual for the Milnor® Continuous Batch Washer) will be ignored by the extractor control. The proper procedure when programming the batch washer is to assign the pass-empty attribute and an unused extract formula number to any empty pocket wash formula (i.e., the pass-empty and purge formulas). When these empty pockets arrive at the extractor, the extractor runs in slow or distribution speed depending on the loading speed in configuration to let the unloading device dump the water into its cylinder (for extractors equipped with a door, the door will open) and displays *Receive Empty Load.*

Any formula number devoted to a "pass-empty" or purge formula in the Milnor® tunnel, should remain un-programmed in the extractor since these formulas will have the pass-empty attribute assigned and will be unused (ignored by the extractor control).

When Cake Data Must Be Confirmed

In the event of a power loss (Three-Wire Disabled error), Receiving Error, Transfer Error, Limit Switch Error (see "M7E EXTRACTOR ERROR MESSAGES"), or manual intervention, the control cannot know whether goods are still present in the cylinder or on Belt B (if provided), and thus considers the batch codes for these locations unreliable and prompts the user for certain information as explained below. Throughout the operating instructions, whenever the operator must respond with cake information, the required key strokes are represented by <responses>.

⚠ WARNING ⚠

CRUSHING AND ENTANGLEMENT HAZARDS. Extractor will resume operating immediately upon entering the requested cake information. Make sure all personnel are clear of extractor mechanisms.

Powering up With Goods in the Extractor Cylinder or With the Cylinder Tilted Up

If the extractor is powered *on* after a brief shutdown and wet goods are in the cylinder, extract these goods by responding *yes* to *Does Extractor Have A Cake?* and *no* to *Discharge Load In Basket?* If the goods remaining in the cylinder are not wet enough to require extraction, or if the extractor was powered *off* with the cylinder tilted up (thus, the goods have already been extracted), discharge these goods from the extractor by responding *yes* to *Does Extractor Have A Cake?* and *yes* to *Discharge Load In Basket?* **even if all of the goods have already discharged onto Belt A.**

⚠ WARNING ⚠

CRUSHING AND ENTANGLEMENT HAZARDS. If the extractor was powered *off* with the cylinder tilted up, it will remain up when first powered *on*. When the control prompts for cake information, the cylinder will either remain up or tilt down, depending on the responses given. Make sure all guards are in place and all personnel are clear before tilting cylinder down.

Responding to Prompts for Extractor Cake Information

To verify its extractor information, the control will prompt

```
DOES EXTRACTOR HAVE
A CAKE? 0=NO 1=YES 0
```

0, ENTER/NEXT — **(No) tells control that extractor is ready to load.** If cylinder was not fully down when powering up, (no Belt B)

```
PRESS NEXT TO BRING
MACHINE DOWN
```

CAUTION: ENTER/NEXT tilts cylinder down. Make sure all personnel are well clear

```
  TILTING DOWN
**PLEASE WAIT**
```

or 1 ABC, ENTER/NEXT — **(Yes) tells the control that goods are still present in the cylinder and/or on Belt A and prompts**

```
ENTER FORMULA
FOR EXTRACTOR    XX
```

Where *XX* is the wash formula number. Change number, if necessary.

ENTER/NEXT — **Accepts the displayed formula number** and prompts:

```
ENTER EXTRACT CODE
FOR EXTRACTOR    XX
```

Where *XX* is the extract code.

If invalid (unprogrammed) extract code is entered, display=

```
ENTER EXTRACT CODEXX
DOES NOT EXIST
```

Where *XX* is the invalid extract code.

CANCEL ESCAPE **Returns to**

```
DOES EXTRACTOR HAVE
A CAKE? 0=NO 1=YES 0
```

Similarly, the control displays all other batch codes for verification, as follows: Dry Code, Destination Code, Customer Code, Goods Code, Soil Weight, Cake Number (single cake question).

The display then prompts

```
DISCHARGE LOAD IN
BASKET? 0=NO 1=YES 0
```

0, ENTER NEXT **(No) tells the control that the previously entered extract formula must be run for the goods currently in the extractor.**

If extractor cylinder was tilted up at power up, and Belt B not configured

```
PRESS NEXT TO BRING
MACHINE DOWN
```

CAUTION: ENTER NEXT tilts cylinder down. Make sure all personnel are clear.

```
TILTING DOWN
**PLEASE WAIT**
```

or 1 ABC, ENTER NEXT **(Yes)** tells the control not to extract the goods currently in the extractor.

```
F05 FORMULA 05
WAIT TIME 00:30
```

Cycle remains at RI . See "The Displays During Normal . . ." in this section.

Responding to Prompts for Conveyor Cake Information

To verify its conveyor (Belt B) information (if Belt B is configured), the control will prompt

```
DOES CONVEYOR HAVE
A CAKE? 0=NO 1=YES 0
```

0, ENTER NEXT **(No) tells the control that there are no goods on the conveyor.**

or 1 ABC, ENTER NEXT **(Yes) prompts**

```
ENTER FORMULA
FOR CONVEYOR XX
```

Where *XX* is formula number currently in memory.

ENTER NEXT **Accepts displayed formula number as correct** (otherwise, enter current formula number).

Similarly, the control displays all other batch codes for verification, as follows: Extract Code, Dry Code, Destination Code, Customer Code, Goods Code, Soil Weight, Cake Number (single cake question).

Belt A runs only if extractor is tilted fully up. If Belt B has a load but the photo-eye is not blocked, Belt B runs until photo-eye blocked or Belt B Clear Time expired.

```
INITIALIZING BELTS
  **PLEASE WAIT**
```

If Belt B runs for the *Belt B Clear Time* without photoeye blocked, it assumes no goods on Belt B.

If the extractor cylinder was tilted up at powering up,

```
PRESS NEXT TO BRING
MACHINE DOWN
```

CAUTION: ENTER NEXT tilts cylinder down. Make sure all personnel are clear.

```
  TILTING DOWN
**PLEASE WAIT**
```

Viewing Inputs and Outputs During Operation

The status of the microprocessor inputs and outputs may be viewed in the *run mode* (while the machine is running).

NOTE: This function displays inputs/outputs while the appropriate keys are held depressed. See "INVOKING FORMULAS MANUALLY, ACTUATING OUTPUTS, VIEWING INPUTS . . ." to display inputs/outputs for longer than a few moments or to manually actuate outputs.

To View Inputs

hold 7 STU — Displays the first 16 inputs (page (0) A-P)

```
(0) ABCDEFGHIJKLMNOP
    -+-+-+-+-+-+-+-+
```

"+" = input made
"-" = input not made

hold 7 STU + 1 ABC — Displays second 16 inputs (page (1) A-P)

hold 7 STU + 2 DEF — Displays third 16 inputs (page (2) A-P)

hold 7 STU + 3 GHI — Displays fourth 16 inputs (page (3) A-P)

hold 7 STU + 4 JKL — Displays fifth 16 inputs (page (4) A-P)

The tables of inputs below identify each input.

Table of Standard Inputs (First 32 Inputs)

First 16 Inputs (Page (0): A-P)			**Second 16 Inputs** (Page (1): A-P)		
Display Code	**Input Name**	**Connector/Pin**	**Display Code**	**Input Name**	**Connector/Pin**
A	Not Used	1MTA38-3	A	Load Level	1MTA4-01
B	Program Key	1MTA38-2	B	Discharge Level	1MTA4-02
C	Signal Cancel	1MTA38-1	C	Three Wire	1MTA4-03
D	End Extract	1MTA38-4	D	Inverter Fault	1MTA4-04
E	Excursion	1MTA38-5	E	Not Used	1MTA4-05
F	Not Used	1MTA38-6	F	Not Used	1MTA4-06
G	Brake Pad	1MTA39-5	G	Not Used	1MTA4-07
H	Load Chute Down	1MTA39-4	H	Brake Pressure	1MTA4-08
I	Load Chute Up	1MTA39-3	I	Speed Switch	1MTA4-11
J	Begin Discharging	1MTA39-8	J	Load Chute Blocked	1MTA4-12
K	Door Down	1MTA39-7	K	Loading Allowed	1MTA4-13
L	Door Up	1MTA39-6	L	Cycle Start	1MTA4-14
M	Not Used		M	Belt A or B Photo-Eye	1MTA4-15
N	Not Used		N	Conveyor Door Down	1MTA4-16
O	Not Used		O	Conveyor Door Up	1MTA4-17
P	Not Used		P	Discharge Allowed	1MTA4-18

Table of Optional Allied Data Pass Inputs

Third 16 Inputs (Page (2): A-P)			**Fourth 16 Inputs** (Page (3): A-P)		
Display Code	**Input Name**	**Connector/Pin**	**Display Code**	**Input Name**	**Connector/Pin**
A	Extract Code A	2MTA4-01	A	Customer Code H	3MTA4-01
B	Extract Code B	2MTA4-02	B	Goods Code A	3MTA4-02
C	Extract Code C	2MTA4-03	C	Goods Code B	3MTA4-03
D	Extract Code D	2MTA4-04	D	Goods Code C	3MTA4-04
E	Dry Code A	2MTA4-05	E	Goods Code D	3MTA4-05
F	Dry Code B	2MTA4-06	F	Goods Code E	3MTA4-06
G	Dry Code C	2MTA4-07	G	Goods Code F	3MTA4-07
H	Dry Code D	2MTA4-08	H	Goods Code G	3MTA4-08
I	Single Cake	2MTA4-11	I	Destination Code A	3MTA4-11
J	Customer Code A	2MTA4-12	J	Destination Code B	3MTA4-12
K	Customer Code B	2MTA4-13	K	Destination Code C	3MTA4-13
L	Customer Code C	2MTA4-14	L	Destination Code D	3MTA4-14
M	Customer Code D	2MTA4-15	M	New Formula	3MTA4-15
N	Customer Code E	2MTA4-16	N	New Customer	3MTA4-16
O	Customer Code F	2MTA4-17	O	Empty Load	3MTA4-17
P	Customer Code G	2MTA4-18	P	Not Used	3MTA4-18

NOTE: The control will permit displaying the third and fourth 16 inputs or outputs, even if Allied Data Pass is not provided, but in this instance, these inputs should always remain "-" (not energized).

Fifth 16 Inputs (Page (4): A-P)					
Display Code	**Input Name**	**Connector/Pin**	**Display Code**	**Input Name**	**Connector/Pin**
A	Photo-eye Input	4MTA4-01	I	Not Used	4MTA4-11
B	Not Used	4MTA4-02	J	Not Used	4MTA4-12
C	Not Used	4MTA4-03	K	Not Used	4MTA4-13
D	Not Used	4MTA4-04	L	Not Used	4MTA4-14
E	Not Used	4MTA4-05	M	Not Used	4MTA4-15
F	Not Used	4MTA4-06	N	Not Used	4MTA4-16
G	Not Used	4MTA4-07	O	Not Used	4MTA4-17
H	Not Used	4MTA4-08	P	Not Used	4MTA4-18

To View Outputs (see Table of Outputs on next page)

hold 8 VWX — Displays the first 16 outputs (page (0) a-p)

```
(0) abcdefghijklmnop
    -+-+-+-+-+-+-+-+
```

"+" = output energized
"-" = output not energized

hold 8 VWX + 1 ABC — Displays the second 16 outputs (page (1) a-p)

hold 8 VWX + 2 DEF — Displays the third 16 outputs (page (2) a-p)

hold 8 VWX + 3 GHI — Displays the fourth 16 outputs (page (3) a-p)

hold 8 VWX + 4 JKL — Displays the fifth 16 outputs (page (4) a-p)

Table of Outputs

	Display Code	Output Name	Connector/Pin	Display Code	Output Name	Connector/Pin
Standard Outputs (first 32 outputs)	**First 16 Outputs** (Page (0) a-p)			**Second 16 Outputs** (Page (1) a-p)		
	a	Distribution Speed	1MTA5-19	a	Brake Release	1MTA13-09
	b	Flag Down Load	1MTA5-18	b	Run Belt A	1MTA13-10
	c	Flag Down Discharge	1MTA5-17	c	Run Belt B	1MTA14-11
	d	Loading Allowed	1MTA5-16	d	Not Used	1MTA14-12
	e	Inflate Seal	1MTA5-14	e	Lower Load Chute	1MTA14-13
	f	Deflate Seal	1MTA5-13	f	Close The Door	IMTA14-14
	g	Door Open	1MTA5-12	g	Not Used	1MTA14-05
	h	Discharge Desired	1MTA5-11	h	Not Used	1MTA14-15
	i	E1/E2 Speed	1MTA13-01	i	Not Used	1MTA14-06
	j	Not Used	1MTA13-02	j	Not Used	1MTA14-16
	k	E3/E4 Speed	1MTA13-03	k	Not Used	1MTA14-07
	l	Clockwise Slow	1MTA13-04	l	Not Used	1MTA14-17
	m	C-Clockwise Slow	1MTA13-05	m	Not Used	1MTA14-08
	n	Load Desired	1MTA13-06	n	Not Used	1MTA14-18
	o	Signal Operator	1MTA13-07	o	Not Used	1MTA14-09
	p	Discharge Finished	1MTA13-08	p	Not Used	1MTA14-19
Opt Allied Data Pass (next 40 outputs)	**Third 16 Outputs** (Page (2) a-p)			**Fourth 16 Outputs** (Page (3) a-p)		
	a	Dry Code A	2MTA5-19	a	Single Cake	2MTA13-01
	b	Dry Code B	2MTA5-18	b	New Formula	2MTA13-02
	c	Dry Code C	2MTA5-17	c	Goods Code A	2MTA13-03
	d	Dry Code D	2MTA5-16	d	Goods Code B	2MTA13-04
	e	Formula A	2MTA5-14	e	Goods Code C	2MTA13-05
	f	Formula B	2MTA5-13	f	Goods Code D	2MTA13-06
	g	Formula C	2MTA5-12	g	Goods Code E	2MTA13-07
	h	Formula D	2MTA5-11	h	Goods Code F	2MTA13-08
	i	Customer A	3MTA5-19	i	Goods Code G	2MTA13-09
	j	Customer B	3MTA5-18	j	New Customer	2MTA13-10
	k	Customer C	3MTA5-17	k	Destination A	2MTA14-11
	l	Customer D	3MTA5-16	l	Destination B	2MTA14-12
	m	Customer E	3MTA5-14	m	Destination C	2MTA14-13
	n	Customer F	3MTA5-13	n	Destination D	2MTA14-14
	o	Customer G	3MTA5-12	o	Not Used	2MTA14-05
	p	Customer H	3MTA5-11	p	Not Used	2MTA14-15
	Fifth 16 Outputs (Page (4) a-p)					
	a	Not Used	2MTA14-06			
	b	Not Used	2MTA14-16			
	c	Not Used	2MTA14-07			
	d	Not Used	2MTA14-17			
	e	Not Used	2MTA14-08			
	f	Not Used	2MTA14-18			
	g	Not Used	2MTA14-09			
	h	Not Used	2MTA14-19			
Std Out. (last 8)	i	Tilt Down Not	4MTA5-19			
	j	Tilt Down Aux	4MTA5-18			
	k	Tilt Up Aux	4MTA5-17			
	l	Conveyor Door Is Up	4MTA5-16			
	m	Tilt Up	4MTA5-14			
	n	Not Used	4MTA5-13			
	o	Not Used	4MTA5-12			
	p	Tilt Down	4MTA5-11			

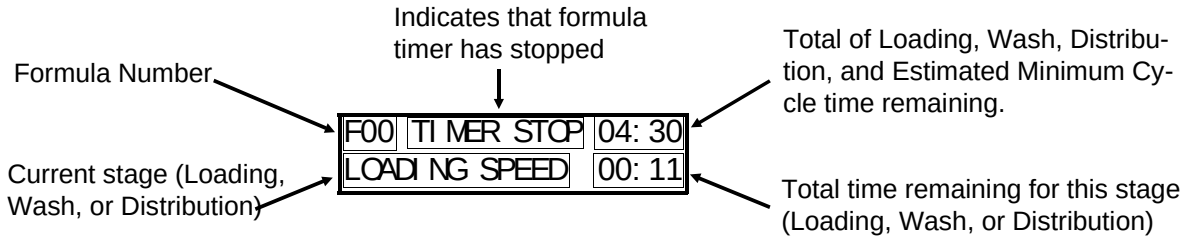
MANUAL FORMULA MODIFICATIONS WITH THE M7E EXTRACTOR CONTROL

Modifying the Extract Sequence

Certain portions of an extract cycle can be manually prolonged or cancelled, while that stage of the cycle is in progress.

Modifying Load Time (LT), Slow Speed Time (ST), or Distribution Time (DT)

TIMER STOP **Stops the formula timer.** Cylinder continues turning at same speed. Display appears as follows (example):


Indicates that formula timer has stopped
Formula Number
Total of Loading, Wash, Distribution, and Estimated Minimum Cycle time remaining.
F00 TIMER STOP 04:30
LOADING SPEED 00:11
Current stage (Loading, Wash, or Distribution)
Total time remaining for this stage (Loading, Wash, or Distribution)

CANCEL ESCAPE **Resumes timing if the timer is stopped.**

EXTEND HELP **Extends this phase of the cycle five seconds each time EXTEND HELP is pressed.** If timer is stopped, this command is ignored.

CANCEL ESCAPE **Cancels this phase of the cycle (cannot cancel draining (DT)) if the timer is running and skips to the next phase of the cycle.**

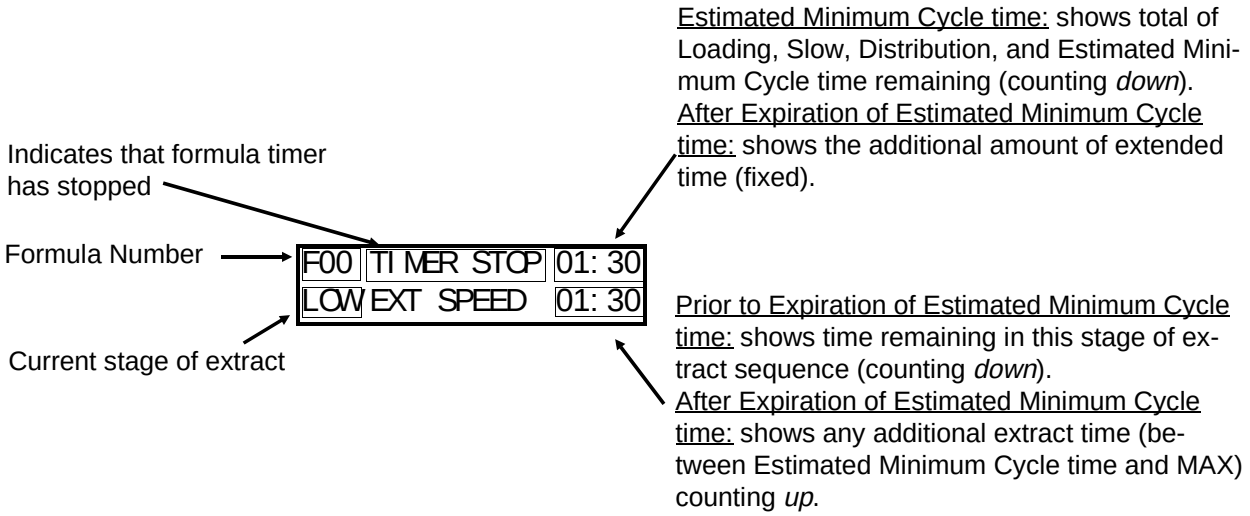
Extending an Extract Prior to Expiration of Estimated Minimum Cycle Time

EXTEND HELP **Extends cycle by 60 seconds.**

Stopping the Timer During Extract and Cancelling an Extract

TIMER STOP

Stops the formula timer if the timer is running. Timer will stop during extraction except during the low extract portion of a Pre + Final extract, during which this command is ignored. Extraction continues at the same speed. Display appears as follows (example):


Estimated Minimum Cycle time: shows total of Loading, Slow, Distribution, and Estimated Minimum Cycle time remaining (counting *down*).
After Expiration of Estimated Minimum Cycle time: shows the additional amount of extended time (fixed).
Indicates that formula timer has stopped
Formula Number
F00 TIMER STOP 01:30
LOW EXT SPEED 01:30
Current stage of extract
Prior to Expiration of Estimated Minimum Cycle time: shows time remaining in this stage of extract sequence (counting *down*).
After Expiration of Estimated Minimum Cycle time: shows any additional extract time (between Estimated Minimum Cycle time and MAX) counting *up*.

CANCEL ESCAPE

Resumes timing if the timer was stopped with TIMER STOP.

CANCEL ESCAPE

Cancels the extract if the timer is running. This command is ignored during the low extract portion of a Pre + Final extract. Braking and SL (Slow Speed) occur after which the machine either tilts up and begins the discharge sequence if the conditions for discharge are met, or remains idle if conditions for discharge are not met.

Modifying Rib Inflation Time

CANCEL ESCAPE

Cancels any programmed RI (Rib Inflation) in progress. The machine either tilts up and begins the discharge sequence if the conditions for discharge are met or remains idle if the conditions for discharge are not met.

NOTE: Rib Inflation cannot be extended, nor can the timer be stopped.

Modifying the Discharge Sequence

Modifying Rib Deflation Time

CANCEL ESCAPE

Cancels any programmed RD (Rib Deflation) in progress. Jogging commences.

NOTE: Rib Deflation time cannot be extended, nor can the timer be stopped. No other modifications are permitted after RD.

INVOKING FORMULAS MANUALLY, ACTUATING OUTPUTS, VIEWING INPUTS, AND ACCESSING DATA ACCUMULATION ON THE M7V & M9V EXTRACTOR CONTROL

The Manual Menu and How To Access It

The Available Modes in the Manual Menu

1=RUN FORMULA (invoke any formula manually)
2=TEST OUTPUTS (actuate any output for testing while the extractor is *not* running a formula)
3=TEST INPUTS (view any input for testing while the extractor is *not* running a formula)
4=DATA ACCUMULATION (display, print, and clear accumulated formula data)
5=PRINT DATA (print formulas and configure codes)
6=LOAD EYE REPORT (print report of load-eye errors)

To Access the Manual Menu

	When the display=	**WAITING FOR LOAD**	
MANUAL	**Accesses the Manual Menu**.	MANUAL MENU 1 RUN FORMULA	Underline indicates blinking cursor. Select one of four manual modes, or return to the *run mode* as explained below.
↑ or ↓	**Scrolls the available choices.**		
or <x>	**Selects Manual Mode x** where <x> is mode number.	MANUAL MENU 2 TEST OUTPUTS	Example: Manual Mode 2 selected.

For Return to Run Mode from Manual Menu

CANCEL ESCAPE	**Causes the control to prompt for cake information** (e.g., *Does Extractor Have A Cake*?) The correct responses must be provided for proper post-wash processing and accounting. See "When Cake Data Must be Confirmed" in "RUNNING THE EXTRACTOR . . . " (see Table of Contents).		
<responses>	**Confirms cake data** where <responses> are as explained in "When Cake Data Must be Confirmed." Control returns to *run mode*.	**WAITING FOR LOAD**	Extractor ready for normal automatic operation.
	With Manual Mode 1, 2, 3, or 4 selected:	MANUAL MENU 2 TEST OUTPUTS	Example: Manual Mode 2 selected.
ENTER NEXT	**Accesses the selected mode.**	DRAIN MOTOR 01	Manual Mode 2 accessed. See instructions in this section.

1=RUN FORMULA

Any of the 16 extract formulas may be manually invoked to test-run the extractor.

⚠WARNING⚠

CRUSHING AND ENTANGLEMENT HAZARDS—When extractor is operating automatically, it will tilt up/down, drive motors will run/stop, conveyors will run/stop, and other devices will move automatically and without warning. Verify all machine guards are in place and personnel cannot enter or reach into the machine. Red *Emergency Stop buttons* on extractor and pull cords on conveyor(s) stop the machine.

When the display= `MANUAL MENU` / `1 RUN FORMULA` — ENTER/NEXT = `RUN FORMULA MANUAL` / `00 FORMULA 00`. Formulas 00-15, if programmed, are available to be run. CANCEL/ESCAPE returns to Manual Menu.

<xx> **Selects a formula number** where <xx> is any formula—example: `RUN FORMULA MANUAL` / `05 COTTON`. Formula 05 selected. If an unprogrammed formula is selected, the message *xx Does Not Exist* will appear.

or ↑ / ↓ Scrolls the available choices

ENTER/NEXT If "three-wire" circuit is open, the display prompts `PRESS START` or `PRESS NEXT TO TILT MACHINE DOWN`

① **Runs the extractor in slow or distribution speed to permit loading**. `WAITING TO LOAD GOODS INTO EXTRACTOR`

ENTER/NEXT **Tells extractor it is loaded and runs selected formula.** Upon completion, display= `RUN FORMULA MANUAL` / `00 FORMULA 00`. See "The Displays During Normal Operation" in "RUNNING THE EXTRACTOR . . ." for displays while formula is running.

CANCEL/ESCAPE **Returns to Manual Menu** (otherwise, select another formula to run).

2=TEST OUTPUTS

By turning on individual outputs, any machine function may be individually actuated for testing via Manual Menu while the machine is *not* running. Outputs can also be viewed (but not actuated) while the machine is operating. See "RUNNING THE EXTRACTOR IN AUTOMATIC."

When the display= `MANUAL MENU` / `2 TEST OUTPUTS` — ENTER/NEXT = `DRAIN MOTOR` / `01`. Outputs in the "Table of Bare Manual OUTPUTS . . .," are available. "00" is reserved for return to Manual Menu.

⚠WARNING⚠

CRUSHING AND ENTANGLEMENT HAZARDS—Bare Manual Outputs actuate extractor mechanisms. Make sure all personnel are well clear.

0, 7 STU **Selects Clockwise Wash.** (example)

```
CLOCKWISE WASH
07 OFF
```

See the two tables of Bare Manual Outputs for complete list of outputs.

ENTER NEXT **Turns the output *on*.**

```
CLOCKWISE WASH
07 ON
```

CANCEL ESCAPE **Turns the output *off*.**

```
CLOCKWISE WASH
07 OFF
```

0, 0, ENTER NEXT **Returns to the Manual Menu (otherwise select another output).**

Table of Bare Manual Outputs for Standard Functions

Keypad Entry	Output Name	Consequences of Actuating Outputs
00	Abort Outputs Test	Returns to Bare Manual Menu.
01	Clockwise Slow*	Turns cylinder clockwise at slow speed.
02	C-clockwise Slow*	Turns cylinder counterclockwise at slow speed.
03	Distribution Speed*	Turns basket at drain speed.
04	1st Extract Speed	Turns cylinder at the 1st extract speed as established by the factory set inverter constants.
05	2nd Extract Speed	Turns cylinder at the 2nd extract speed as established by the factory set inverter constants.
06	3rd Extract Speed	Turns cylinder at the 3rd extract speed as established by the factory set inverter constants.
07	4th Extract Speed	Turns cylinder at the 4th extract speed as established by the factory set inverter constants.
08	Brake Release	Output *on* releases brake.
09	Signal	Sounds operator alarm.
10	Open Door	Opens the extractor door if so equipped.
11	Close Door	Closes the extractor door if so equipped.
12	Inflate Seal	Inflates the ribs inside basket.
13	Deflate Seal	Deflates the ribs inside basket.
14	Tilt Machine Up**	Tilts the shell up.
15	Tilt Machine Down	Tilts the shell down.
16	Lower Load Chute	Lowers loading chute. When output is *off*, chute moves up.
17	Run Belt A	Runs belt under basket.
18	Run Belt B	Runs external discharge belt if supplied.
19	Flag Down Load	Extends the load-end shuttle target if so equipped.

* When output is turned *on*, clutch is engaged, brake is released, and motor turns on. When output is turned *off*, motor is turned off and brake is applied.
**Even though proximity switches are made, when resting on safety stands, the extractor will tilt up fully for two seconds when this output is actuated allowing removal of the stands.

Table of Bare Manual Outputs for Standard Functions, continued

Keypad Entry	Output Name	Consequences of Actuating Output
20	Flag Down Discharge	Extends the discharge-end shuttle target, if so equipped.
21	Load Allowed Output (Loading Allowed)	Turns on the output used to signal an allied loading device that extractor can now receive a load.
22	Discharge Desired	Turns on the output used to signal an allied receiving device (non-Miltrac system) that the extractor desires to discharge.
23	Discharge Finished (Cylinder Desires Discharge)	Turns on the output used to signal an allied receiving device that the extractor cylinder desires to discharge.
24	Load Desired	Turns on the output used to signal an allied loading device (non-Miltrac system) that the extractor desires to receive a load.

Table of Bare Manual Outputs for Optional Allied Data Pass

If Allied Data Pass is provided, actuating any of the following outputs closes one microprocessor relay used with other relays to pass batch codes in binary to an allied receiving device.

Keypad Entry	Output Name	Keypad Entry	Output Name	Keypad Entry	Output Name	Keypad Entry	Output Name
Sixteen Dry codes		256 Customer Codes		New vs. Same Formula		New vs. Same Customer	
25	Dry Code A	33	Customer A	42	New Formula	50	New Customer
26	Dry Code B	34	Customer B	128 Customer Codes		Sixteen Destinations	
27	Dry Code C	35	Customer C	43	Goods A	51	Destination A
28	Dry Code D	36	Customer D	44	Goods B	52	Destination B
Sixteen Formula Codes		37	Customer E	45	Goods C	53	Destination C
29	Formula A	38	Customer F	46	Goods D	54	Destination D
30	Formula B	39	CUSTOMER G	47	Goods E		
31	Formula C	40	Customer H	48	Goods F		
32	Formula D	One vs. Two Cakes		49	Goods G		
		41	SINGLE CAKE				

NOTE: The control will permit accessing and turning on the Allied Data Pass outputs even if Allied Data Pass is not provided, but in this instance, no output relays will be energized.

3=TEST INPUTS

The *on/off* state of each input to the microprocessor can be displayed via the Manual Menu while the extractor is not running.

NOTE: Inputs can also be viewed while the machine is operating. See "RUNNING THE EXTRACTOR IN AUTOMATIC."

Viewing Standard Inputs (First 32 Inputs)

When the display=

```
MANUAL MENU
3 TEST INPUTS
```

ENTER/NEXT **Displays the first 16 inputs (page 0: A-P)**

```
(0) ABCDEFGHIJKLMNOP
    -+-+-+-+-+-+-+-+
```

Input display code shown on top line (see "Table of Standard Inputs . . .") and the status of the input is shown below its code ("+" = input energized or "-"= input not energized).

7 STU + 1 ABC **Displays the second 16 inputs (page 1: A-P)**

```
(1) ABCDEFGHIJKLMNOP
    -+-+-+-+-+-+-+-+
```

CANCEL/ESCAPE **Returns to the Manual Menu.**

Table of Standard Inputs (First 32 Inputs)

First 16 Inputs (Page 0: A-P)			**Second 16 Inputs** (Page 1: A-P)		
Display Code	**Input Name**	**Connector/ Pin**	**Display Code**	**Input Name**	**Connector/ Pin**
A	Not Used	1MTA38-3	A	Load Level	1MTA4-01
B	Program Key	1MTA38-2	B	Discharge Level	1MTA4-02
C	Signal Cancel	1MTA38-1	C	Three Wire	1MTA4-03
D	End Extract	1MTA38-4	D	Inverter Fault	1MTA4-04
E	Excursion	1MTA38-5	E	Not Used	1MTA4-05
F	Not Used	1MTA38-6	F	Not Used	1MTA4-06
G	Brake Pad	1MTA39-5	G	Not Used	1MTA4-07
H	Load Chute Down	1MTA39-4	H	Brake Pressure	1MTA4-08
I	Load Chute Up	1MTA39-3	I	Speed Switch	1MTA4-11
J	Begin Discharging	1MTA39-8	J	Load Chute Blocked	1MTA4-12
K	Door Down	1MTA39-7	K	Loading Allowed	1MTA4-13
L	Door Up	1MTA39-6	L	Cycle Start	1MTA4-14
M	Not Used		M	Belt A or B Photo-eye	1MTA4-15
N	Not Used		N	Conveyor Door Down	1MTA4-16
O	Not Used		O	Conveyor Door Up	1MTA4-17
P	Not Used		P	Discharge Allowed	1MTA4-18

Viewing Allied Data Pass Inputs—If the extractor uses Allied Data Pass (requiring two additional 16/8 I/O boards and one additional 16 Output board), the status of the associated inputs may be viewed as follows:

NOTE: The control will permit displaying the last 32 inputs even if Allied Data Pass is not provided, but in this instance none of these inputs are used and thus will remain *off* (-).

When the display=

```
MANUAL MENU
3 TEST INPUTS
```

7 STU + 2 DEF — Displays the third 16 inputs (page 2: A-P)

```
(2) ABCDEFGHIJKLMNOP
    +-+-+-+-+-+-+-+-
```

Input display code shown on top line (See "Table of Optional Allied Data Pass Inputs . . .") and the status of the input is shown below its code ("+" = input energized or "-" = input not energized).

7 STU + 3 GHI — Displays the fourth 16 inputs (page 3: A-P)

```
(3) ABCDEFGHIJKLMNOP
    -+-+-+-+-+-+-+-+
```

7 STU + 4 JKL — Displays the fifth 16 inputs (page 4: A-P)

```
(4) ABCDEFGHIJKLMNOP
    -+-+-+-+-+-+-+-+
```

CANCEL ESCAPE — Return to the Manual Menu.

Table of Optional Allied Data Pass Inputs

Third 16 Inputs (Page 2: A-P)					
Display Code	**Input Name**	Connector/Pin	**Display Code**	**Input Name**	**Connector/Pin**
A	Extract Code A	2MTA4-01	I	Single Cake	2MTA4-11
B	Extract Code B	2MTA4-02	J	Customer Code A	2MTA4-12
C	Extract Code C	2MTA4-03	K	Customer Code B	2MTA4-13
D	Extract Code D	2MTA4-04	L	Customer Code C	2MTA4-14
E	Dry Code A	2MTA4-05	M	Customer Code D	2MTA4-15
F	Dry Code B	2MTA4-06	N	Customer Code E	2MTA4-16
G	Dry Code C	2MTA4-07	O	Customer Code F	2MTA4-17
H	Dry Code D	2MTA4-08	P	Customer Code G	2MTA4-18

NOTE: The control will permit displaying the last 32 inputs even if Allied Data Pass in not provided, but in this instance, these inputs should always remain "-" (not energized).

Table of Optional Data Pass Inputs and Photo-Eye Inputs

Fourth 16 Inputs (Page 3: A-P)			**Fifth 16 Inputs** (Page 4: A-P)		
Display Code	**Input Name**	**Connector/Pin**	**Display Code**	**Input Name**	**Connector/Pin**
A	Customer Code H	3MTA4-01	A	Photo-eye Input	4MTA4-01
B	Goods Code A	3MTA4-02	B	Not Used	4MTA4-02
C	Goods Code B	3MTA4-03	C	Not Used	4MTA4-03
D	Goods Code C	3MTA4-04	D	Not Used	4MTA4-04
E	Goods Code D	3MTA4-05	E	Not Used	4MTA4-05
F	Goods Code E	3MTA4-06	F	Not Used	4MTA4-06
G	Goods Code F	3MTA4-07	G	Not Used	4MTA4-07
H	Goods Code G	3MTA4-08	H	Not Used	4MTA4-08
I	Destination Code A	3MTA4-11	I	Not Used	4MTA4-11
J	Destination Code B	3MTA4-12	J	Not Used	4MTA4-12
K	Destination Code C	3MTA4-13	K	Not Used	4MTA4-13
L	Destination Code D	3MTA4-14	L	Not Used	4MTA4-14
M	New Formula	3MTA4-15	M	Not Used	4MTA4-15
N	New Customer	3MTA4-16	N	Not Used	4MTA4-16
O	Empty Load	3MTA4-17	O	Not Used	4MTA4-17
P	Not Used	3MTA4-18	P	Not Used	4MTA4-18

4=DATA ACCUMULATION

Data Available—The control stores data pertaining to loads processed that can be used for both accounting purposes and to gauge efficiency of operation. This data is available for the last load processed. The control also accumulates totals per formula as well as for all formulas combined since the last time data was cleared. The data includes:

- LOADS—The number of loads processed (if applicable).
- FORMULA NUMBER—(if applicable)
- RUN TIME—Total time taken to process a load from start to end of cycle including error and wait time except for WT1 and WT2 (see below).
- WT1 TIME—Time extractor was idle *Waiting For Load*.
- WT2 TIME—Time extractor was waiting to discharge because the device to which the extractor sends its goods (e.g., Belt B, shuttle) was unavailable.
- ERROR (E, ER, or ERR) TIME—Time during which normal operation is suspended due to an error condition. This time is included in Run Time above.

Accumulated data is protected by the same battery and capacitor as are the formulas (see "Important Owner User Information") when power is off.

Available Modes in the Data Accumulation Sub-menu

0=DISPLAY DATA (view accumulated data on the display)

1=PRINT (print accumulated data if a printer is installed)

2=CLEAR (clear all accumulated totals)

To Access the Data Accumulation Sub-menu

When the display=

MANUAL MENU
4 DATA ACCUMULATION

ENTER/NEXT =

0 0=DISPLAY DATA
1=PRINT 2=CLEAR

This is the Data Accumulation Sub-menu

For Quick Exit from Anywhere in Data Accumulation

CANCEL/ESCAPE **Returns to the next higher menu.** Repeat until desired menu appears.

Data Accumulation: 0=Display Data

When the display=

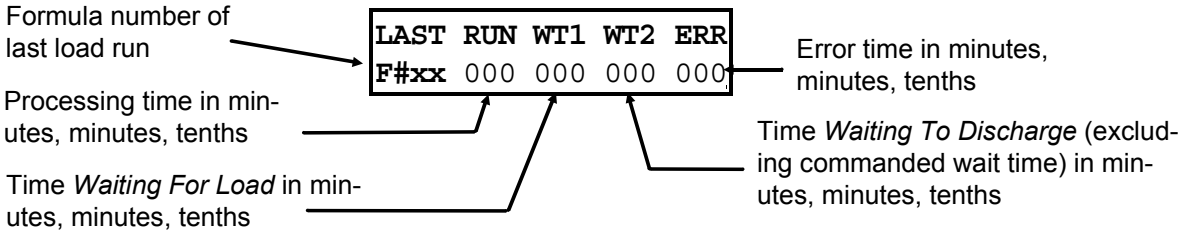
```
0 0=DISPLAY DATA
1=PRINT 2=CLEAR
```

[ENTER/NEXT] =

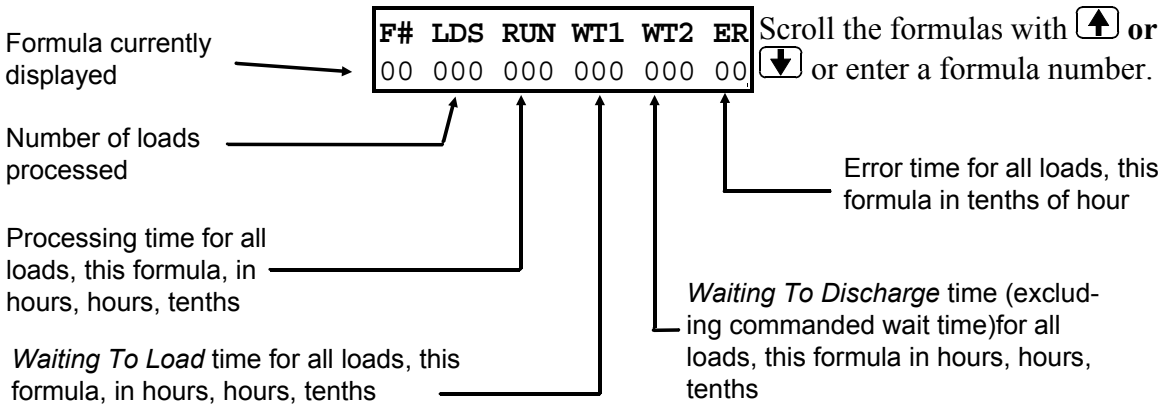
```
0 0=LAST LOAD
1=FORMS 2=TOTAL
```

This is the Display Data Sub-menu.

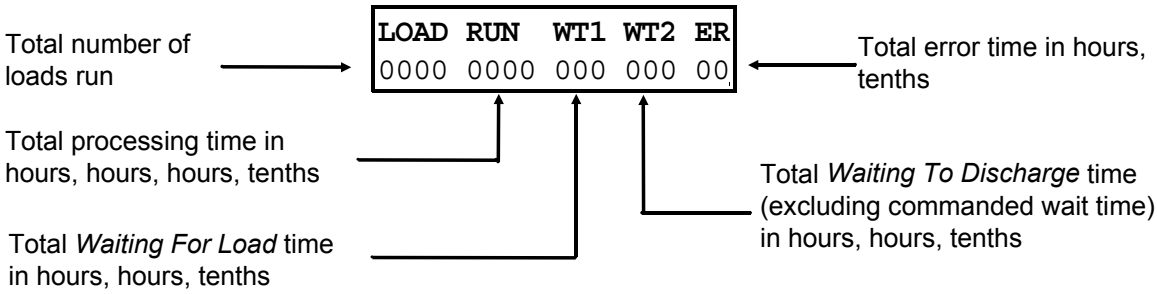
[0], [ENTER/NEXT] **Displays the data for the last load processed.**


Formula number of last load run
LAST RUN WT1 WT2 ERR
F#xx 000 000 000 000
Error time in minutes, minutes, tenths
Processing time in minutes, minutes, tenths
Time Waiting To Discharge (excluding commanded wait time) in minutes, minutes, tenths
Time Waiting For Load in minutes, minutes, tenths

or [1], [ENTER/NEXT] **Permits selecting a specific formula to display.**


Formula currently displayed
F# LDS RUN WT1 WT2 ER
00 000 000 000 000 00
Scroll the formulas with ↑ or ↓ or enter a formula number.
Number of loads processed
Error time for all loads, this formula in tenths of hour
Processing time for all loads, this formula, in hours, hours, tenths
Waiting To Discharge time (excluding commanded wait time)for all loads, this formula in hours, hours, tenths
Waiting To Load time for all loads, this formula, in hours, hours, tenths

or [2], [ENTER/NEXT] **Displays totals for all formulas**


Total number of loads run
LOAD RUN WT1 WT2 ER
0000 0000 000 000 00
Total error time in hours, tenths
Total processing time in hours, hours, hours, tenths
Total Waiting To Discharge time (excluding commanded wait time) in hours, hours, tenths
Total Waiting For Load time in hours, hours, tenths

Data Accumulation: 1=Print

When the display=

```
0 0=DISPLAY DATA
  1=PRINT 2=CLEAR
```

1 ABC, ENTER NEXT — **Enables printing of accumulated data and prompts for the date.**

```
DATE: MM-DD-YYYY
      XX-XX-XXXX
```

The control provides for entering today's date at the top of the printout.

ENTER NEXT, ENTER NEXT, ENTER NEXT — **Retains the date shown.**

Or enter a new date as in the following example:

0 _/$, 9 YZ-, ENTER NEXT — **Enters 09 for the day.** Cursor advances to month.

```
DATE:  MM-DD-YYYY
       09-XX-XXXX
```

1 ABC, 2 DEF, ENTER NEXT — **Enters 12 for the month.** Cursor advances to year.

```
DATE:  MM-DD-YYYY
       09-12-XXXX
```

1 ABC, 9 YZ-, 9 YZ-, 1 ABC — **Enters 1991 for year.**

```
DATE:  MM-DD-YYYY
       09-12-1991
```

ENTER NEXT — **Accepts year and begins printing.**

```
PRINTING . . .
  **PLEASE WAIT**
```

A sample printout is shown in Figure 1.

After printing, display returns to Data Accumulation menu.

Data Accumulation: 2=Clear

When the display=

```
0 0=DISPLAY DATA
1=PRINT 2=CLEAR
```

2 DEF, ENTER NEXT — **Enables clearing of all accumulated data**

```
NEXT TO CLEAR DATA
CANCEL = ESCAPE
```

ENTER NEXT — **Clears all accumulated data from memory.** Display returns to the Data Accumulation menu.

or CANCEL ESCAPE — **Returns to the Data Accumulation menu without clearing data.**

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D A T A A C C U M U L A T I O N

0 = LAST FORMULA RUN

FORMULA #	RUN TIME MMT	WAIT TIME #1 MMT	WAIT TIME #2 MMT	ERROR TIME MMT
03	054	001	000	000

1 = DATA PER FORMULA

FORMULA #	# OF LOADS #	RUN TIME HHT	WAIT TIME #1 HHT	WAIT TIME #2 HHT	ERROR TIME T
00	044	021	006	001	2
03	013	007	003	000	0
12	006	004	000	000	0

2 = TOTAL ACCUMULATION DATA

TOTAL	# OF LOADS #	RUN TIME HHHT	WAIT TIME #1 HHHT	WAIT TIME #2 HHHT	ERROR TIME HT
	0063	0032	0010	0001	02

NOTES:

# = Number
T = Tenth of hour
WAIT TIME #1 = Load Wait Time
WAIT TIME #2 = Discharge Wait Time
HHT = Hours-Hours-Tenth of hour
HHHT = Hours-Hours-Hours-Tenth of hour
MMT = Minutes-Minutes-Tenth of minute
***** = Data has reached maximum stored value

FIGURE 1 (MSOP0906AE)
Sample Printout—Data Accumulation

5=PRINT DATA

Program Menu, Mode 5 (Print Data) prints the formulas and configure codes on a serial printer which can be temporarily connected to the machine via a socket on the control. A mating plug to this socket is provided for the user's convenience in wiring the printer interface cable. See wiring instructions in "THE EXTERNAL SERIAL LINK CABLES AND HOW TO CONSTRUCT THEM." Sample printouts are shown in Figures 2, 3, and 4.

When the display=

```
MANUAL MENU
5 PRINT DATA
```

ENTER/NEXT

```
PRINT DATA
0 FORMULAS
```

0=FORMULAS (all formulas)
1=CONFIGURATION

↑ or ↓ **Scrolls the choices**

ENTER/NEXT **Prompts for today's date**

```
DATE: MM-DD-YYYY
      mm dd yyyy
```

Enter today's date, where *mm* is a two-digit number for the month (e.g., March=03), *dd* is a two-digit number for the day of the month (e.g., 08), and *yyyy* is the year.

When printing begins, display=

```
PRINTING . . . .
**  PLEASE WAIT  **
```

When printing is concluded, display returns to Program Menu.

```
MANUAL MENU
1 RUN FORMULA
```

6=LOAD-EYE REPORT

Data Available—The control stores data of load- eye error that can be used to troubleshoot continuing receive and discharge problems.

- LOAD NUMBER—The number of loads processed.
- LOAD WEIGHT—The total weight of the goods.
- GOODS CODE—Type of goods processed.
- FORMULA NUMBER—The processed formula number.
- BEGIN—The number of errors detected in the first distribution (loading sequence).
- REDIS—The number of errors detected in the redistribution of pre-extract.
- TOTAL—The total number of errors detected for processed formula.

Load-eye report data is protected by the same battery and capacitor as are the formulas when power is off.

Available Modes in the Load-Eye Report Sub-menu

1=PRINT REPORT (print load-eye error report if a printer is installed).

2=CLEAR ALL DATA

To Access the Load-Eye Report Sub-menu

When the display=

```
MANUAL MENU
5 LOAD-EYE REPORT
```

ENTER/NEXT =

```
LOAD-EYE REPORT
1 PRINT REPORT
```

This is the Load-Eye Report sub-menu

Load-Eye Report: 1=Print Report

When the display=

```
LOAD-EYE REPORT
1 PRINT REPORT
```

ENTER/NEXT

Enables printing the load-eye report and prompts for the date.

```
DATE:  MM-DD-YYYY
       mm-dd-XXXX
```

The control provides for entering today's date at the top of the printout. See "Data Accumulation: 1=Print" (see Table of Contents) for detailed explanation of entering the date.

After printing, display returns to Load-Eye Report menu.

For Quick Exit from Anywhere in Load-Eye Report

CANCEL ESCAPE **Returns to the next higher menu.** Repeat until desired menu appears.

Load-Eye Report: 2=Clear

	When the display=	LOAD-EYE REPORT 1 PRINT REPORT
2 DEF, ENTER NEXT	**Enables clearing the load-eye report.**	**CLEAR ALL DATA** **PRESS 4 + 5 + 6**
4 JKL + 5 MNO + 6 PQR	**Clears the load-eye report.**	LOAD-EYE REPORT 2 CLEAR ALL DATA

P E L L E R I N M I L N O R C O R P O R A T I O N

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LOAD EYE REPORT

ITEM NO	LOAD NO	LOAD WEIGHT	GOODS CODE	FORMULA NUMBER	LOAD EYE INFO BEGIN	REDIS.	TOTAL
001	0005	184.3	016	10	02	00	002
002	0015	150.6	018	11	03	00	003
003	0016	145.7	016	10	03	00	003
004	0019	158.7	033	03	03	00	003
					00011	00000	00011

FIGURE 2 (MSOP0906AE)
Sample Printout: Load-Eye Report

Section 3

Troubleshooting

M7E, M7V, M9E, & M9V EXTRACTOR ERROR MESSAGES

The following are the messages that can result from an error condition (e.g., improper procedure, microprocessor component failure, mechanical malfunction) or while correcting an error condition.

Power Up Error Messages

CONFIG ERROR TURN KEY TO PROGRAM	The configure data is corrupt, (possibly as a result of turning power *off* while in the Program Mode). Machine must be reconfigured.
	Accesses Program Mode 3—CONFIGURE
LANGUAGES 0=ENGLISH	See "3=CONFIGURE . . ." in "PROGRAMMING THE M7E . . . EXTRACTOR CONTROL"
CLEAR MEMORY NOW PRESS 4 + 5 + 6	Control detected an error in configuration or program memory (usually because power was lost or *Master switch* turned *off* while keyswitch was at *Program*), and the CPU could not be certain that the memory was not corrupted upon power up. When the CPU can be confident of uncorrupted memory, the control will power up in the Program Menu and display *OK Turn Key To Run*.
	Enables clearing formula memory.
	Clears entire formula memory. All formulas revert to their default values.
CLEARING MEMORY **PLEASE WAIT**	See "1=ADD/CHANGE FORMULA" in "PROGRAMMING THE M7E . . . EXTRACTOR CONTROL"
PROGRAM 0 MENU OK TURN KEY TO RUN	Keyswitch was incorrectly set at *Program* at power up, but the control has determined that formula and configure data is reliable.
	Returns to the *run mode*
THREE WIRE DISABLED	At power up this message appears following the power up displays until ① is pressed to closed the three-wire circuit (which provides power to the extractor). ① may be pressed at any time during the power up displays, thus silencing the operator alarm and overriding this message. If ① fails to clear this message, see "Operational Error Messages" in this section.
name FAILED CHECK THIS BOARD	Where *name* is "8/16 IO #1", "8/16 IO #2", "8/16 IO #3", "8/16 IO #4", "24 OUT #1", or "24 OUT #2". The named control circuit board failed or is missing. If future machine options require boards, this message will result if such an option is configured, but the requisite board is not installed. Refer to schematic manual to identify boards by board number.

CANCEL ESCAPE Resets the control. This permits access to the Program Menu whether or not the condition is corrected and permits running a formula in *automatic* or *manual* if the condition is corrected.

-KEY PAD ERROR- **key name**

Keypad key shorted or stuck depressed where *key name* is the name of the offending key. This condition must be corrected before extractor can be programmed or run.

ACCUM. DATA ERROR **NEXT TO CLEAR DATA**

The control detected invalid accumulator data (usually because of a power surge at power ON). ENTER NEXT clears all totals. See "4=DATA ACCUMULATION" in "MANUAL FORMULA MODIFICATION . . ." for an explanation of accumulated data.

Configuration/Programming Error Messages

FORM xx INCOMPLETE **TURN KEY TO PROGRAM**

Control detected an incomplete or invalid formula that must be deleted from memory, where *xx* is the number of the offending formula; usually caused by turning the keyswitch to *run* without ending the formula. Turning keyswitch back to *program* will display the invalid formula number and delete this formula, after which *OK Turn Key To Run* will appear.

Deletes this formula only and displays

DELETING FORMULA xx ****PLEASE WAIT****

Where *xx* is the number of the formula being deleted.

The display then returns to Program Menu.

PROGRAM 0 MENU OK TURN KEY TO RUN

COPY SOURCE xx DOES NOT EXIST

Copy Old To New (Program Menu, Mode 2) was attempted with a non-existent source formula where *xx* is the number of the nonexistent formula. This message remains on the display, permitting entry of another formula number.

COPY DESTINATION xx ALREADY EXISTS

Copy Old To New (Program Menu, Mode 2) was attempted to a destination containing a formula where *xx* is the number of the existing formula. Display remains on screen, permitting entry of another formula number.

ERROR IN CHECK SUM NEXT TO PROCEED

On a machine receiving data during a download operation, this machine indicates that downloading was unsuccessful. See "4=DOWNLOAD" in "PROGRAMMING THE M7E . . . EXTRACTOR CONTROL."

Operational Error Messages

⚠WARNING⚠

SHOCK HAZARD—When troubleshooting any electrical fault, lock *off* and tag out power at the external disconnect switch before accessing any electric box or electrical component.

⚠ WARNING ⚠

CRUSHING AND ENTANGLEMENT HAZARDS—When troubleshooting any mechanical fault, lock *off* and tag out power at the external disconnect switch before accessing any extractor mechanism. Extractor will resume operation immediately upon fault correction as explained in this section. Make sure all personnel are clear of extractor mechanisms.

name BOARD FAILED **CHECK THIS BOARD**	See explanation in "Power Up Error Messages" in this section.
THREE WIRE DISABLED *any message*	The three-wire relay became de-energized. This relay provides control circuit power to the machine. Once energized by momentarily depressing ①, it is held energized by its own normally open contact, along with motor overloads, etc. Should any of these contacts open, even momentarily, the machine stops and displays *Three-wire Disabled* plus those specific reasons mentioned below. These messages will remain even if the contact only opened momentarily, and will reappear if the *Master switch* is turned *off* and then *on* again. These messages can only be cleared by pushing ①, and then only if the cause of the error is corrected.
①	Closes the three-wire circuit and prompts for cake information. The proper responses must be provided to tell the control if the extractor (and Belt B, if one is provided) has goods and if it does, what the batch codes are.
<responses>	Confirms cake data, where <responses> are as explained in "When Cake Data Must Be Confirmed" in "RUNNING THE EXTRACTOR IN AUTOMATIC."

THREE WIRE DISABLED FAULT: WASH OVERLOAD	Wash motor overload opened.	**THREE WIRE DISABLED** **FAULT:DRAIN OVERLOAD**	Drain motor overload opened.
THREE WIRE DISABLED FAULT: E1 OVERLOAD	E1 (low-speed extract) motor overload opened.	**THREE WIRE DISABLED** **FAULT: E2 OVERLOAD**	E2 (high-speed extract) motor overload opened.

PRESS START THREE WIRE DISABLED	A formula was selected to run manually (*manual mode*), but the three-wire relay became de-energized. ① closes the three-wire circuit, permitting the formula to run.

THREE WIRE DISABLED SEE MANUAL	The three-wire relay became de-energized, but the control cannot determine the cause. This is usually the result of pressing the Stop button or pulling an *Emergency Stop switch*. See "If the Three-Wire Circuit Was Disabled Without Power Loss" in "RUNNING THE EXTRACTOR IN AUTOMATIC."
SPEED SWITCH OPEN	Control sees speed switch open, indicating that 1) the basket is rotating at speed which keeps the speed switch open, or 2) a malfunction in the speed switch circuitry occurred (if the basket is stopped). When the speed switch input is made, operation resumes.
BRAKE FAULT, MUST BE CLEAR TO RESTART	Brake Pressure switch saw insufficient air pressure in the brake release air cylinder to guarantee that the brake has released. Possible causes include 1) low air pressure (frequently caused by too small an air supply pipe to the machine), 2) leaking quick release valve, pilot air valve, or piston cup in air cylinder, 3) pinched or leaking brake air lines. Operation resumes when cause of error is corrected.
CONVEYOR DOOR IS NOT DOWN	The conveyor door is the moving panel that permits clearance for the extractor drain. It is normally commanded to move down when the extractor is at the intermediate point and must move *down* fully within five seconds after the extractor has tilted up fully to discharge, otherwise this error occurs. Any malfunction of the door mechanism or *down* proximity switch must be corrected before normal operation can resume. The error clears automatically when the Conveyor Door Down input is made.
CONVEYOR DOOR IS NOT UP	Normally the conveyor door is commanded to move up when the extractor desires to tilt down and must move to the fully up position within ten seconds after the extractor desires to tilt down or this error will occur. Any malfunction of the door mechanism or UP proximity switch must be corrected before normal operation can resume. The error clears automatically when the Conveyor Door Up input is made.

⚠ DANGER ⚠

ENTANGLEMENT HAZARD—The linen inside or hanging partially outside a turning cylinder can suddenly wrap around your hand, arm, or body and twist off/sever it. Lock *off* and tag out power at external disconnect before clearing the load chute.

LOAD CHUTE IS NOT DOWN	The load chute is commanded down when the machine starts the loading sequence, but if the load chute is not down ten seconds after the loading sequence starts, this error message is displayed and the cylinder stops. SIGNAL CANCEL returns to the start of the loading sequence once the cause of the error is corrected. Machine must be configured for this option, otherwise the error is ignored.
LOAD CHUTE IS NOT UP	The load chute is commanded up when DT (Distribution) starts. However, if the load chute is not up during the last five seconds of distribution, this error message is displayed and the cylinder stops. SIGNAL CANCEL restarts the cycle once the cause of the error is corrected. Machine must be configured for this option, otherwise error ignored.

DOOR IS NOT UP, PRESS SIGNAL CANCEL	The door is commanded up at the start of the loading or discharge sequence. Once the door is commanded up, it must move up fully within ten seconds or this error occurs. SIGNAL CANCEL returns to the start of the loading or discharge sequence once the cause of this error is corrected. Machine must be configured for this option; otherwise, the error is ignored.
DOOR IS NOT DOWN, PRESS SIGNAL CANCEL	The door is commanded down after the extractor receives or discharges a load. Once the door is commanded down, it must move down fully within ten seconds or this error occurrs. SIGNAL CANCEL starts the cycle once the cause of this error is corrected. Machine must be configured for this option, otherwise error is ignored.
LOAD CHUTE BLOCKED PRESS SIGNAL CANCEL	The load chute photo-eye was blocked (or its connection to the microprocessor broken) during the last five seconds of Distribution Time (DT). This also stops the cylinder. The condition must be corrected before operation can resume. SIGNAL CANCEL restarts the cycle if cause of the error is corrected.
PHOTO-EYE FAILED PRESS SIGNAL CANCEL	If Belt B is not provided, the photo-eye failed to make, then break, during discharge to assure goods have passed it. The Belt B photo-eye is made when the control knows the belt should be empty or the input is not made when the control knows the belt should contain goods. This condition must be corrected before normal operation can resume. SIGNAL CANCEL resumes operation if the cause of the error is corrected.
LIMIT SWITCH ERROR PRESS SIGNAL CANCEL	A malfunction caused the Down limit switch and Up limit switch to both be made simultaneously. This condition must be corrected before normal processing can resume.

SIGNAL CANCEL — Clears the error message if the malfunction was corrected and causes the control to prompt for cake information (e.g., *Does Extractor Have A Cake?*). The correct responses must be provided to tell the control if the extractor (and Belt B, if one is provided) has goods and if so, the batch codes for the batches in those locations.

<responses> Confirms cake data, where <responses> are as explained in "When Cake Data Must Be Confirmed" in "RUNNING THE EXTRACTOR IN AUTOMATIC."

RECEIVING ERROR, PRESS SIGNAL CANCEL	The extractor received a formula code that is not currently programmed in the extractor control or for Miltrac systems only, or a malfunction during transfer occurred in the device from which the extractor is receiving its goods.

SIGNAL CANCEL — Cancels the Receiving Mode and causes the control to prompt for cake information (e.g., *Does Extractor Have A Cake?*). The correct responses must be provided to tell the control whether or not transfer occurred and if so, the batch codes for the goods that just entered the extractor.

<responses> Confirms cake data, where <responses> are as explained in "When Cake Data Must Be Confirmed" in "RUNNING THE EXTRACTOR IN AUTOMATIC."

TRANSFER ERROR, PRESS SIGNAL CANCEL	Applies to Miltrac systems only. A malfunction during transfer occurred in the device to which the extractor is sending its goods.
SIGNAL CANCEL	Cancels the transfer and causes the control to prompt for cake information in the extractor (or on Belt B if one is provided). The correct responses must be provided to tell the control whether or not transfer occurred. If no transferr occured, the batch codes for goods about to leave the extractor (or Belt B) must be provided, too.
<responses>	Confirms cake data, where <responses> are as explained in "When Cake Data Must Be Confirmed" in "RUNNING THE EXTRACTOR IN AUTOMATIC."
-KEY PAD ERROR- key name	See explanation in "Power Up Error Messages" in this section.
LOAD EYE WAS BLOCKED PRESS SIGNAL CANCEL	The controller detects that the load eye was blocked three times during the distribution speed of the loading sequence or redistribution of the pre-extract sequence.
SIGNAL CANCEL	Restarts the cycle at wash speed if the condition is corrected.
CHECK BRAKE SHOES PRESS SIGNAL CANCEL	The controller sees the brake pad input each time power is applied to the machine or each time the configured *Check Brake Pad Time* time expires after power is applied.
SIGNAL CANCEL	Clears the error message. The message will recur every time the configured *Check Brake Pad Time* expires or power is applied to the machine until the controller no longer detects a defective brake pad.

The following two errors apply to single motor extractors only:

INVERTER FAULT PRESS SIGNAL CANCEL	Inverter fault indication. Check inverter. Press SIGNAL CANCEL to re-start.
SPEED SWITCH FAULT PRESS SIGNAL CANCEL	Speed switch was closed when it should have been opened. Press SIGNAL CANCEL to re-start.

Section 4

Supplemental Information

THE HARDWARE IN SERIAL-TYPE MICROPROCESSORS FOR MARK IV AND V MACHINES C

General

Milnor® serial microprocessor controls are designed specifically for Milnor® machines and systems. Along with certain external electromechanical relay logic and sensing devices, they control all machine and system functions. **Not every microprocessor includes all the components described in this section.**

The Microprocessor Components

This is a list of all components for Milnor® microprocessor controllers. Not every Milnor® microprocessor controller includes all the following components.

1. Keypad or Keyboard—Depending upon the model/type, the keypad may have 12, 30, or 58 buttons. The different keypads are not interchangeable.

2. Keyswitch—Selects run/program modes. The key may be removed only in *run*. **Never leave the key accessible to unauthorized personnel.**

3. Display—Depending upon the model/type, the display may be either liquid crystal, fluorescent, or CRT. The different displays are not interchangeable.

4a. Power Supply (NOT for CBW® System)—Converts control circuit AC voltage to +12VDC, -12VDC, and +5VDC for the CPU board. On dryers and some other machines, a second, identical power supply performs the same function for all the peripheral boards, which are mounted in an enclosure separate from the CPU.

A minimum 14AWG ground wire must be connected between the grounds on the CPU and the peripheral board(s). This ground is installed at the factory when both enclosures are mounted on the same machine, as in washer-extractors. The ground wire must be provided during installation when the CPU enclosure and its associated peripheral board enclosures are remote from one another as in dryers.

Although the +12VDC and -12VDC are not adjustable, the +5VDC for the CPU is very sensitive. The power supply must be adjusted most accurately, **so the actual voltage *at the CPU board* is between 4.95VDC and 5.1VDC as measured by an accurate digital voltmeter.** B

4b. Power Supply (CBW® System Only)—The Milnor® CBW® System utilizes two discrete power supplies to convert control circuit AC voltage to +12 VDC, -12 VDC, and +5VDC for the CPU board and peripheral boards.

One power supply (ESPS) is a 40-watt power supply located in the Miltron cabinet. It powers the peripheral boards in the Miltron cabinet, including the optional load cell interface board and A/D board for a weighing conveyor, the CPU board and the memory expansion board, and the monitor interface board.

Although the +12VDC and -12VDC are not adjustable, the +5VDC for the CPU is very sensitive. The power supply must be adjusted accurately, **so the actual voltage *at the CPU board* is between 4.95VDC and 5.1VDC as measured by an accurate digital voltmeter.** B

The second power supply (PSO) is a 120-watt power supply which provides +12VDC, -12VDC, and +5VDC to the peripheral boards located on the tunnel. This power supply provides for the adjustment of the +12VDC voltage, the -12VDC voltage, and the +5VDC voltage. If these voltages require adjustment, set the +5VDC to provide no less than +4.8VDC at the module electric box farthest from the power supply, as measured by an accurate digital voltmeter. If necessary, adjust the +12VDC to 12.00VDC and the -12VDC to -12.00VDC as measured by an accurate digital voltmeter.

If the +5VDC at the peripheral board nearest PSO is at least +5.25VDC when the voltage at the peripheral board farthest from PSO is +4.8VDC or less, suspect loose MTA connections or inadequate wiring somewhere between the nearest and farthest peripheral boards.

5. CPU (Processor) Board—The Central Processing Unit (CPU) processes data received from the various inputs, stores information, and responds to each keypad entry with the appropriate action. It may be mounted in an enclosure separate from its peripheral boards. The CPU contains EPROMs programmed by the Milnor® factory with fixed instructions (software) that determine how the machine functions. Depending upon machine model/type, the CPU chip can be an Intel 8085, an Intel 8088, or an Intel 80186.

Although the EPROMs do not require battery backup, the CPU board utilizes a battery which normally assures that the user-programmable memory will be retained for two to three months without external power. See below and "IMPORTANT OWNER/USER INFORMATION . . ." (see Table of Contents).

6. Memory Expansion Board—Increases memory space available to the processor. This board is used with 8088 CPU board in some applications.

7. Battery—Provides memory retention backup when power is *off*. The battery is mounted directly on 8085 CPU boards, and mounted separately for 8088 and 80186 CPU boards. A capacitor on the 8088 and 80186 CPU board provides enough power to retain memory for several hours after the battery has been disconnected. Once fully charged (see "IMPORTANT OWNER/USER INFORMATION . . ."), the battery backup is reliable for 90 days with no power applied.

8. Opto-Isolator Board—Optically isolates inputs to the CPU for electronic noise immunity. Opto-Isolators are incorporated into the 8088 and 80186 CPU board; thus this separate board is only required for 8085 CPUs.

9. I/O Board—16/8 input-output contains 16 solid-state signal input devices and eight output relays. The input devices are capable of faithfully conducting a low VA 12VDC ground signal to the CPU. The output relays are socket-mounted SPDT, 12VDC electromechanical relays with contacts capable of faithfully conducting a *maximum* of 25VA at 110/120VAC (0.2 ampere or 200 milliamperes at 110/120VAC) or 12.5 VA at 24VAC (0.5 ampere or 500 milliamperes at 24VAC). The output will be either 24VAC or 110/120VAC depending on the machine model/type.

These outputs and their power source are intended only to drive another relay with higher contact ratings, that in turn may drive a pump, valve, solenoid, etc., from a separate power source. **Never use these outputs to directly drive a pump, valve, or solenoid unless the maximum current required never exceeds the above values. Higher ampere or VA loads will burn out traces on the printed circuit board or possibly overload and damage the control circuit transformer.**

This board has 25 status lights. One light blinks when the board is sending signals. Each of the 24 remaining lights represent an input (green lights) or output (red lights) on that board, and illuminates when the corresponding input or oututs is made. This board has two rotary dials which must be adjusted to set the board's address (see "Rotary Switches and How to Set Them" in this section). This board also has convenient test points that can be used to test voltage to the board.

Standard I/O board—Used in all devices requiring I/O boards except those listed below.
High-speed I/O board—Used only in the following devices and configurations: E6N, J6N, and T6N washer-extractors equipped and configured for ***both*** **variable basket speed and electronic balancing**; Milrail configured for high-speed boards; and all configurations of the M7E centrifugal extractor.

10. Output Board—A 24-output board contains 24 output relays, the same board and relays as described above.

11. A/D Board (Analog to Digital Convertor)—Converts analog voltage signals, such as temperature, to a digital signal that can be utilized by the CPU. Up to a maximum of eight A/D channels may be provided on a single board. Although seemingly identical, the A/D boards used to sense air temperature in the dryer, water temperature in washer-extractors and textile machines, water temperature in the tunnel, and weight for a weighing conveyor are all different. **The different types are clearly marked with different part numbers, which are mentioned in the wiring diagram set and *are not interchangeable*.**

This board has one status light. This light blinks when the board is communicating. This board has two rotary dials which must be adjusted to set the board's address (see "Rotary Switches and How to Set Them"). This board also has convenient test points that can be used to test voltage to the board.

12. D/A Board (Digital to Analog Convertor)—Converts digital signals from the processor to an analog voltage between 0 and 5VDC (e.g., provides the analog signal to the dryer gas valve position actuator and dye machine steam position actuator).

This board has one status light. This light blinks when the board is communicating. This board has two rotary dials which must be adjusted to set the board's address (see "Rotary Switches and How to Set Them"). This board also has convenient test points that can be used to test voltage to the board.

13. CRT Board—Receives display instructions from the processor and generates the signals to the CRT to create the desired displays; used in controllers such as the Miltron and Miltrac controllers and Device Master systems.

⚠ CAUTION ⚠

The CRT board can be plugged in backwards, even though the cabinet/bracketry makes this difficult to do and labeling on the parent board states the proper orientation. Use care to orient the board properly, otherwise microprocessor components may burn out.

14. Resistor Boards—Although seemingly identical, resistor boards are quite different. **The different types are clearly marked with different part numbers, which are mentioned in the wiring diagram set and *are not interchangeable.***

a. **For Temperature-Sensing System**—Used with A/D board in washer-extractors and Dye-Extractors® as part of temperature-sensing system; not required on continuous batch washers because necessary circuitry is included on other (standard) CBW® printed circuit boards.
b. **For Gas Valve**—Used with D/A board in temperature control circuit of gas dryers; converts 0-5VDC to 4-20 milliamperes for modulating gas valve.
c. **For Steam Valve**—Used with D/A board in temperature control circuit of older steam dryer models; converts 0-5VDC to 4-20 milliamperes for modulating steam valve. See "4-20MA Output Board" in this section.

15. Signal Conditioner for Thermocouple—Amplifies the output from a thermocouple so an A/D board can use the signal.

16. Rotation Safety Board—Used in dryers. Reads rotational safety proximity switch to confirm that the basket is turning.

17. Temperature Probes—Two types of temperature probes are used, depending on equipment type:

Thermistor temperature probes—A temperature-sensitive resistor whose resistance changes with respect to temperature; uses include washer-extractors, textile machines, and continuous batch washers.
Thermocouple temperature probes—A connection of dissimilar metals which produces a voltage with respect to its temperature; uses include dryers.

18. Weigh Scale Interface Board—Regarding machine logic, this is located between the load cell of the weighing conveyor (CONWA) and the weighing conveyor A/D board. It interprets data from the conveyor load cell to the A/D board.

19. 4-20MA Output Board—Used on newer textile machines and steam dryers with temperature control. See "Resistor Boards/c. For Steam Valve" in this section.

20. 8 Out/16 In Chemical Flow Meter Board—This board is used with the metered chemical injection option on textile machines. Eight outputs and eight counters are respectively assigned to chemical valves and chemical flow meters. Two of the counters are non-isolated direct inputs to the microprocessor *on this board* and are capable of of counting pulses of 0 to 5 VDC at a frequency of up to 10kHz. the remaining six counters are optically isolated from the peripheral board microprocessor and are capable of counting pulses from 0 to 12 VDC at a frequency up to 150 Hz.

The Serial Communications Port

All Milnor® serial microprocessors have a serial port with a nine-pin receptacle and plug to pass data to other devices via one of several special serial cables to *Download* or to *Print data* when their software supports these functions (e.g., see programming information). For more information on the various separate serial cables required for these functions, see external serial link cable information in this manual (see Table of Contents), if applicable.

Which Boards Are Used in Various Devices

Board / Device	CPU	I/O	Output	A/D	D/A	CRT	Opto-Isolator	Temp Sensing Resistor	Gas Valve Resistor	Steam Valve 4-20MA	Signal Conditioner	Chem Flow Meter	Rotation Safety	Weigh Scale Interface
COSHA	1	2[1]	—	—	—	—	—	—	—	—	—	—	—	—
COBUC	1	2[1]	—[1]	—	—	—	—	—	—	—	—	—	—	—
DEVICE MASTER*	1	2[1]	—[1]	—	—	1	—	—	—	—	—	—	—	—
DRYER	1	2	1	1[4]	1[2]	—	—	—	1[2]	—[2]	1	—	1	—
TEXTILE*	1	1	2	1[4]	1	—	—	1	—	1	—	0[1]	—	—
LINEAR COSTA	1	1[1]	—	—	—	—	—	—	—	—	—	—	—	—
LINK MASTER	1	—	—	—	—	—	—	—	—	—	—	—	—	—
MILTRAC*	1	—	—	—	—	1	—	—	—	—	—	—	—	—
PRESS	1	2[1]	1[1]	1	—	—	—	—	—	—	—	—	—	—
EXTRACTOR	1	2	1[1]	—	—	—	—	—	—	—	—	—	—	—
VERTSTO	1	2	—	—	—	1	—	—	—	—	—	—	—	—
W/E (MARK I)	NOTE 7	1[1]	1[1]	1[3,4]	—[1]	—	1	1	—	—	—	—	—	—
W/E (MARK II)	1	1[1]	1[1]	1[3,4]	—[1]	—	—	1	—	—	—	—	—	—
CBW® System*	1	2+1 per module	—[1]	1 per 8[4] modules 1,5,6	—	1	—	—	—	—	—	—	—	1[5]

*80186 CPU

1. Boards can be added for options

2. For gas dryers and steam dryers with temperature control

3. For washer-extractors with temperature option

4. Although seemingly identical, the A/D boards for sensing air temperature in dryers, water temperature in washer-extractors and dye machines, water temperature in tunnels and weight for weighing conveyors are all different.**The different types have different part numbers, are clearly marked, and are not interchangeable.**

5. Required for CBW® system with weighing conveyor

6. Required for Reuse/Cooldown and/or Overhead Fill tanks

7. The Mark I washer-extractor control used an 8085 CPU

NOTE: Additional boards may be required for certain other options.

Rotary Switches and How To Set Them

The Input/Output board, the Output board, the A/D board, and the D/A board each have two rotary switches which establish the address for each board. This allows the boards to communicate serially with its own CPU, as though on a "party line," while sending and receiving its own messages. In a battery of machines, the rotary switches are identical for each identical peripheral board in each identical machine (e.g., each first I/O board (I/O-1) in each washer-extractor has the identical rotary switch setting). When a CPU must communicate with a higher level control (e.g., when all dryers communicate with the Milnet® system), the higher level control must know the address of each CPU. For 8088 CPUs, the high level control knows the address of each CPU because that information was established during configuration (e.g., see Miltrac Address configure decision in the programming manual for any device that communicates with Miltrac).

Rotary Switch Settings

Board / Device	A/D		D/A		I/O-1		I/O-2		I/O-3		I/O-4		Output-1		Output-2		Output-3	
	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1
COSHA					0	1	0	2	0	3	0	4						
COBUC					0	1	0	2	0	3	0	4						
Device Master					0	1	0	2	0	5			1	1	1	2	1	3
Dryer	2	1	3	1	0	1	0	2					1	1				
Textile	2	1	3	1	0	1	0	2					1	1	1	2	1	3
Linear Costo					0	1	0	2										
One-stage Press			3	1	0	1	0	2	0	3			1	1				
Two-stage Press	2	1			0	1	0	2	0	3	0	4	1	1	1	2		
Extractor					0	1	0	2	0	3	0	4	1	1	1	2		
Versto					0	1	0	2										
Washer-Extractor	2	1	3	1	0	1	0	2					1	1	1	2	1	3
CBW system	See schematics for rotary switch positions on Continuous Batch Washers and the MILTRON controller.																	
	Shaded cells represent optional boards.																	

INTERFACING MILNOR® EXTRACTORS WITH ALLIED (NON-MILNOR®)SYSTEMS

Milnor® extractors can be supplied with potential-free contacts to permit interfacing with allied loading and receiving systems including electromechanical (relay-oriented) systems to pass the batch codes listed in the table below. For all signals to Milnor®, the allied equipment must provide potential-free contacts capable of faithfully conducting low energy signals of 5 to 150 milliamps at 5VDC to 12DC. These signals ground a Milnor® computer input, thus go directly into the computer, and must never be run adjacent to, or in the same conduit with any other wires. For all signals from Milnor®, potential-free contacts capable of conducting up to a maximum of 3VA at up to a maximum of 120VAC will be provided. These signals can only be used to close 120VAC interface relays (a source of 120VAC is available for this purpose (see schematic manual)), and may not be used to directly energize any device consuming more current or requiring a higher voltage than stipulated.

⚠ CAUTION ⚠

All MILNOR® signals are conducted by "traces" on the computer boards. These traces may burn out if called upon to handle heavy currents. Thus, they must never be connected to a load greater than 3VA at 120VAC (a maximum of .125 amperes at a maximum of 120VAC). Heavier loads may burn out the traces and ruin expensive computer boards.

If allied loading is configured, then these binary inputs become available to any loading device that must communicate using relay logic (e.g., allied or non-serial device).

If allied discharge is configured, these binary outputs become available to any receiving device that must communicate using relay logic (e.g., allied or non-serial device). See the extractor schematic manual for detailed wiring and signal information.

Table of Batch Codes for Allied Data Pass

Code	Number of Codes Available	Decimal	Binary
Dry code	16	00-15	0000-1111
Single Cake	16	00-15	0000-1111
Customer	1	0-1	0-1
Goods	128	0-127	000000-111111
Destination	128	0-127	000000-111111
New Formula	16	0-15	0000-1111
New Customer	1	0-1	0-1
New Customer	1	0-1	0-1

HOW TO CHANGE EPROMS IN MICROPROCESSORS AND WHERE TO CHECK THE DC VOLTAGES

Occasionally, software enhancements become available. Depending upon the software change, the new software EPROMs (Erasable, Programmable, Read-Only Memory) may be offered for sale or for no charge to the customer. When a set of EPROMs is changed in the field, ensure that the software version being installed matches the machine hardware and that EPROMs are installed in the proper socket positions and orientation.

How To Change EPROMs

⚠ WARNING ⚠

SHOCK HAZARD—Electrical components on the machine conduct high voltage that will kill or seriously injure you on contact.

☞ **Lock OFF and tag out electrical power at the main (wall) disconnect before beginning this procedure.**

1. Make sure all power to the machine is *off*.
2. Locate the EPROMs as described in "Location of EPROMs on Processor Board" in this section. Note the orientation of the EPROMs as shown in FIGURES 3, 5, 7, and 9.
3. Slip a small flat tool underneath the EPROM, and carefully remove each old EPROM from its base, taking note of their numerical order (see FIGURES 3 and 7) and orientation to the key notch on the socket.
4. Install new EPROMs, making sure the key notch on the EPROM is properly oriented and that all pins enter the proper holes in the socket (FIGURE 1). If necessary, slightly bend the pins on the EPROMs to align them in the socket. After inserting each EPROM, verify that all pins are seated in the socket.

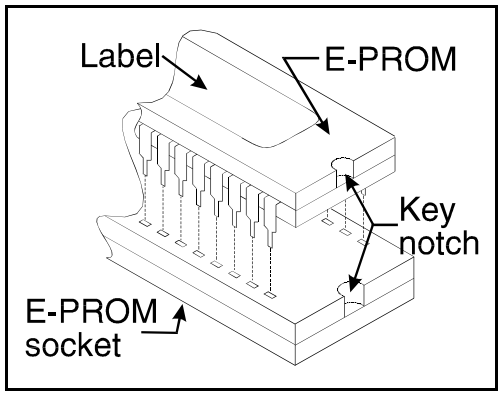
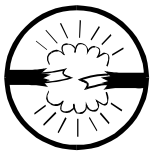


FIGURE 1 (MSSM0217AE)
Properly Seating the EPROM

⚠ CAUTION ⚠



COMPONENT DAMAGE HAZARD—Incorrectly installing any EPROM may cause EPROM burn out, machine failure, or display error.

☞ **Match each EPROM with its corresponding socket. Each EPROM will *work* in only one socket, although it may physically *fit* in others.**

☞ **Align EPROM so every pin mates with the correct hole in the socket.**

Verifying Proper EPROM Installation—After installing new EPROMs, apply power to the machine and turn the machine *on*. If the EPROMs are properly installed, the display will continue with the normal display sequence when powering up. If the display is blank or appears unusual, turn the machine *off* at once and check the orientation of the EPROMs.

B
C

Location of EPROMs on Processor Board

Depending on machine model and type, the CPU chip can be an Intel 8085 or an Intel 8088. Each microprocessor board requires at least one EPROM for proper operation, but the EPROMs are located differently, depending upon the type of board. This information describes the location and arrangement of the EPROM chips on each type of board. It also describes where to check the voltages required by the processor board.

8085 Processor Boards, *NOT Coin Machine*—See FIGURE 3. Install EPROM #1 at the end of the row, then #2, #3, and #4. Chip #4 goes next to the two soldered chips on the board. See FIGURE 2 for where to check voltages.

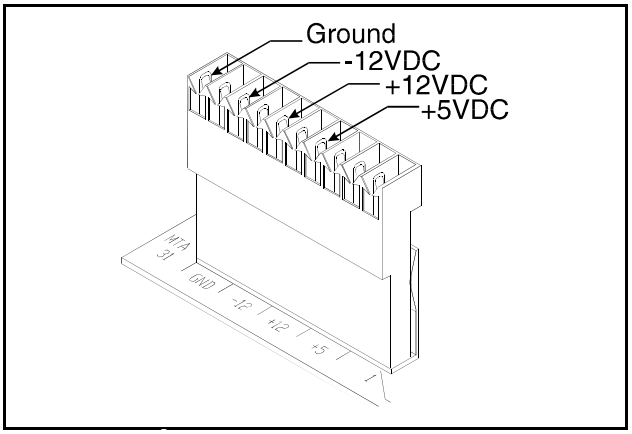


FIGURE 2 (MSSM0217AE)
MTA-31 on 8085 Processor Board
(wires not shown for clarity)

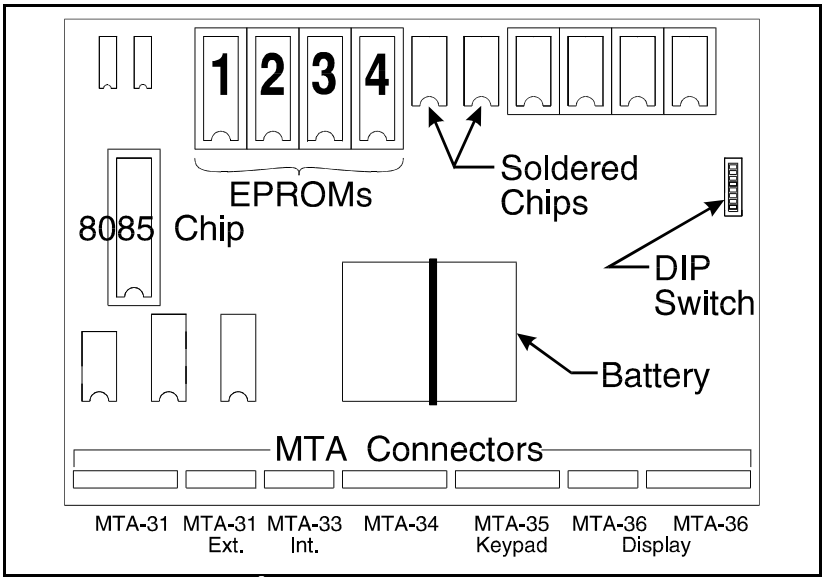


FIGURE 3 (MSSM0217AE)
8085 Processor Board (NOT Coin Machine)

8085 *Coin Machine* Processor Boards—See FIGURE 5. Install the single EPROM in socket IC7 below connector W34. These boards have no battery.

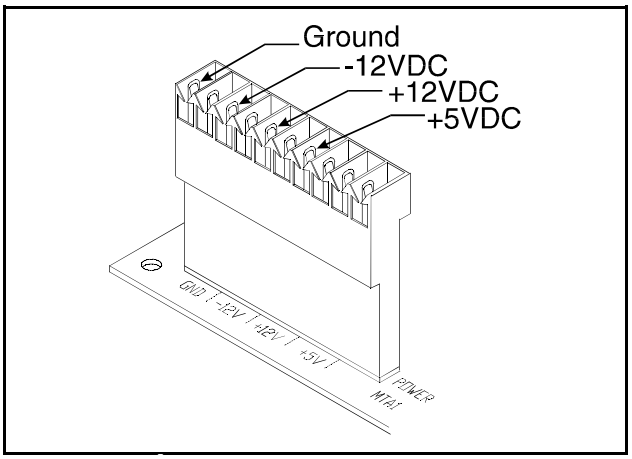


FIGURE 4 (MSSM0217AE)
MTA-1 in 8085 Coin Machine
(wires not shown for clarity)

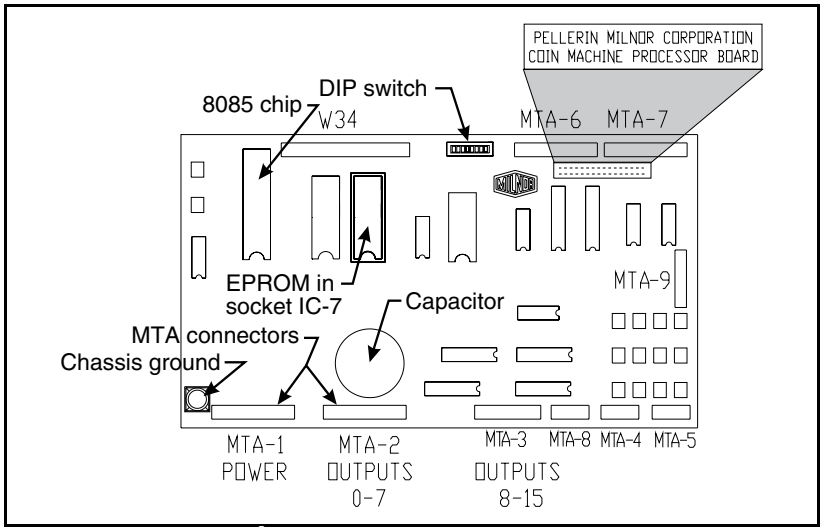


FIGURE 5 (MSSM0217AE)
8085 Coin Machine Processor Board

B
C

8088 Processor Boards *Without Memory Expansion Board*—See the table of EPROM locations (below) and FIGURE 7. If the set consists of only one EPROM, install it in socket A of FIGURE 7. If two EPROMs comprise the set, install EPROM #2 in socket A and EPROM #1 in socket B. **Always install highest numbered EPROM in socket A.** If the set consists of more than two EPROMs, a Memory Expansion Board must be present in the machine along with the processor board.

8088 Processor Boards *With Memory Expansion Board*—See the table of EPROM locations below and FIGURE 7. If the EPROM set consists of three or more EPROMs, install the two highest numbered EPROMs (e.g., EPROMs #3 and #4 of a four-chip set) *on the processor board*, with the highest numbered E-PROM (EPROM #4 of a four-chip set) in socket A, and the EPROM with the second highest number (EPROM #3 of a four-chip set) in socket B. *Install the remaining EPROM(s) on the Memory Expansion Board* with the highest numbered of the remaining EPROMs (e.g., EPROM #2 of a four-chip set) in socket IC-1 on the Memory Expansion Board and EPROM #1 in socket IC-2.

EPROM Locations on 8088 Processor Board and Memory Expansion Board				
	E-PROM Location by Socket (see FIGURE 4)			
EPROMS in Set	A	B	IC-1	IC-2
4-chip set	4	3	2	1
3-chip set	3	2	1	—
2-chip set	2	1	—	—
1-chip set	1	—	—	—

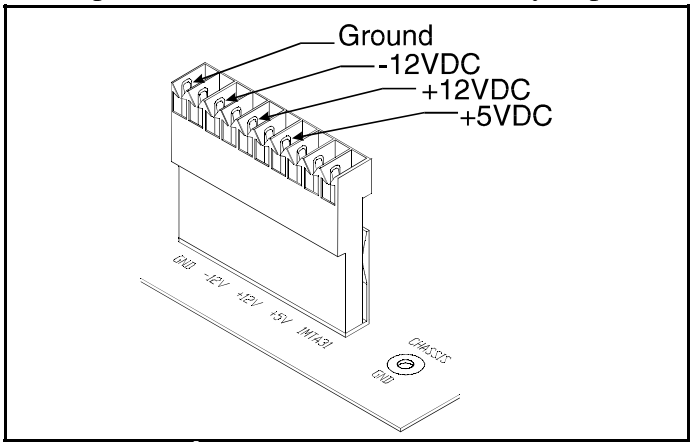


FIGURE 6 (MSSM0217AE)
1MTA-31 on 8088 Board (wires not shown for clarity)

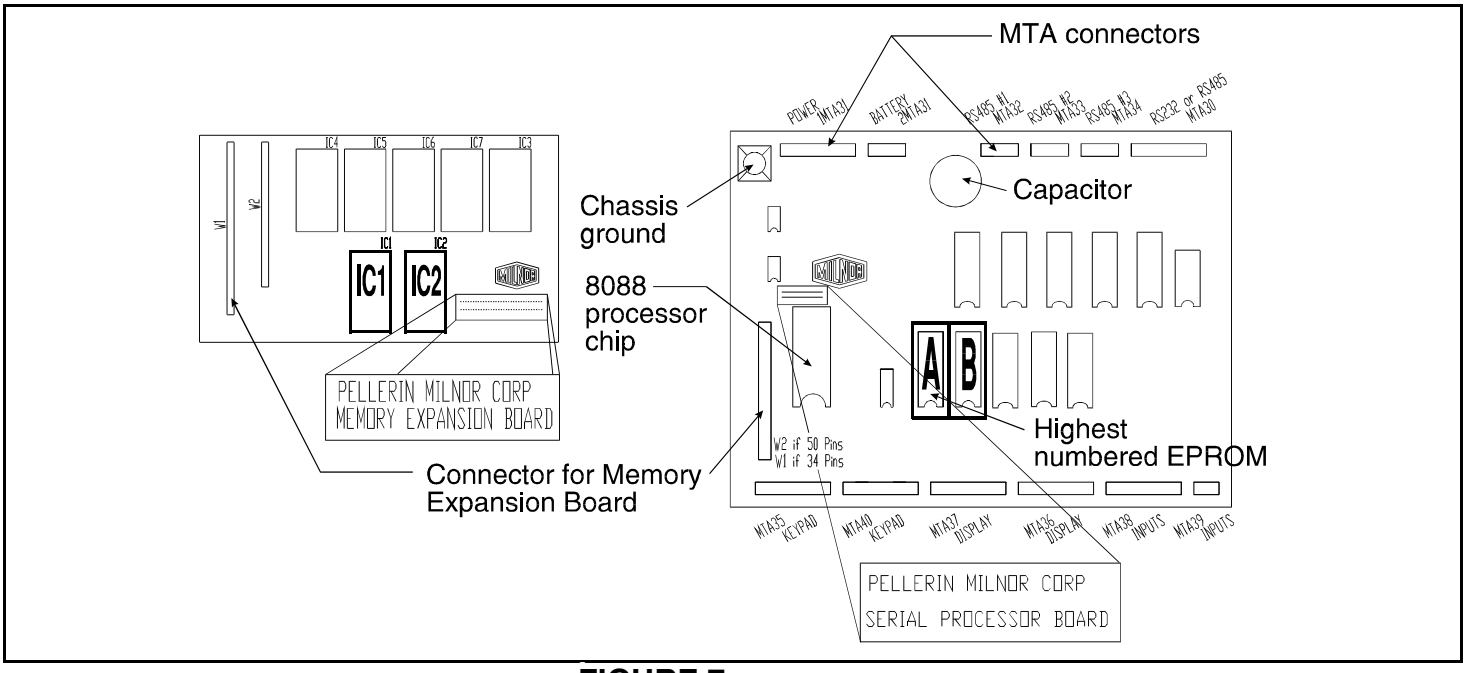


FIGURE 7 (MSSM0217AE)
8088 Processor Board and Optional Memory Expansion Board

80186 Processor Boards—This processor board is used on all Milnor system controllers (Miltron, Mildata, etc.) equipped with a color monitor, and on textile processing machines with software versions 95000 and later. The single EPROM on this board is located in socket IC-2.

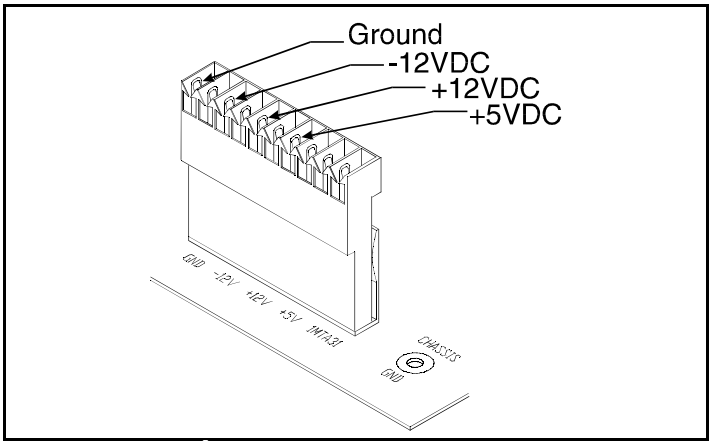


FIGURE 8 (MSSM0217AE)
1MTA-31 on 80186 Board (wires not shown for clarity)

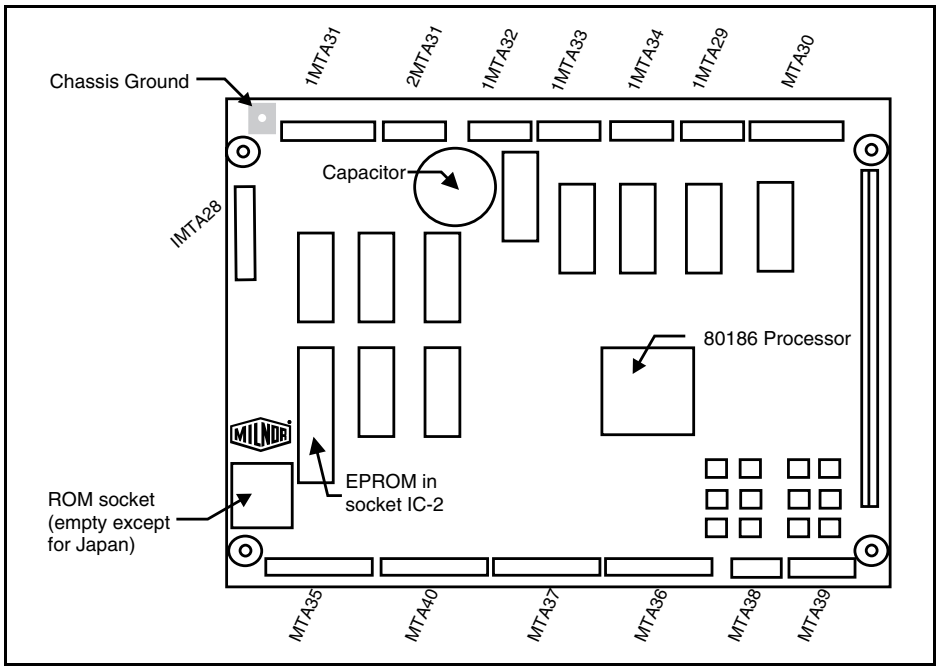


FIGURE 9 (MSSM0217AE)
80186 Processor Board

THE EXTERNAL SERIAL LINK CABLES AND HOW TO CONSTRUCT THEM

General

Only three wires (two signal wires plus a ground, referred to in this section as a *serial link*) are required to transfer data from one Milnor® device to another. However, because the two optional serial communicating functions (*Download* and *Print Data*, but not interconnected networks such as Milnet®/Miltrac or Mildata® systems) are conducted through a single external DIN-type, 9-pin connector, different *serial links* will be required for the two functions; it may be necessary to temporarily disconnect one plug from the connector and insert another to access the other optional function. *Non-optional* serial communications (as between Mildata® networks and a bank of washer-extractors, or as between Milnet®/Miltrac systems and the press, shuttle, and dryers in a CBW® system) are hard-wired internally either at the factory or during system installation. Thus, except for some field retrofit situations, these network systems generally do not use the external connector mentioned above.

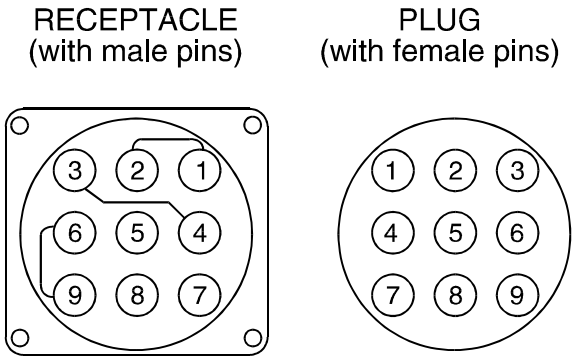
In Mildata® systems, the functions of *Download* and *Print Data* are usually performed at the Mildata® PC itself, but each washer-extractor (and certain other machines if their software supports it) can also *Download* or *Print Data* via its external connector.

⚠ CAUTION ⚠

If *Download* or *Print Data* is performed from serial downloader-to-machine or machine-to-machine with machines in a Milnet®/Miltrac or Mildata® network system, *ALL* energized machines on the network will receive the downloaded data. Turn *off* power to any machines to which you do not wish to *Download*.

Pin Identification

Pin locations looking at the **wire entry side** of the female RECEPTACLE (i.e., from inside the enclosure). The female RECEPTACLE always has male pins. Ordinarily, all wires entering this RECEPTACLE are inserted at the factory. Pins 1+2, 3+4, and 6+9 on the RECEPTACLE have been connected together at the factory as shown.



Pin locations looking at the **wire entry side** of the male PLUG. The male PLUG always has female pins. The wires entering this PLUG are inserted by others when the Serial Link cables are fabricated in the field, and by the factory if for a SERIAL DOWNLOADER interface.

FIGURE 1 (MSSM0227AE)
Pin Locations in the External Serial Link Connector

Pin Assignments in the External Connector

PIN NUMBER	FUNCTION	WIRES ON RECEPTACLE INSIDE ELECTRICAL ENCLOSURE	
		Number	Color
1+2	SERIAL LOW	DLL	BLUE and BLACK
3+4	SERIAL HIGH	DLH	BLUE and RED
5	CLEAR TO SEND	CTS	BLUE and ORANGE
6+9	ELECTRONIC GROUND	2G	BLUE and WHITE
7	TRANSMIT DATA	TXD	BLUE and ORANGE
8	+5DC	V1	BLUE

⚠ CAUTION ⚠

AVOID EQUIPMENT DAMAGE—Never connect pin 8 between any machines or to the printer. This pin conducts +5VDC from the machine's power supply. Pin 8 is used only to power the SERIAL DOWNLOADER INTERFACE. If pin 8 is connected to any pin in the connector or the printer or any other machine, the two volt sources will clash and burn up expensive electronic components in both machines.

How To Construct (Wire) the Serial Link Cables

The Type of Cable Wire To Use—Use 18AWG four-conductor shielded cable. **Connect the shield to the ground at one end only.** See the various drawings below.

⚠ CAUTION ⚠

AVOID EQUIPMENT DAMAGE—Never connect pin 8 between any machines or to the printer. This pin conducts +5VDC from the machine's power supply. Pin 8 is used only to power the SERIAL DOWNLOADER INTERFACE. If pin 8 is connected to any pin in the connector or the printer or any other machine, the two volt sources will clash and burn up expensive electronic components in both machines.

To Download From Machine-to (from)-Serial Downloader

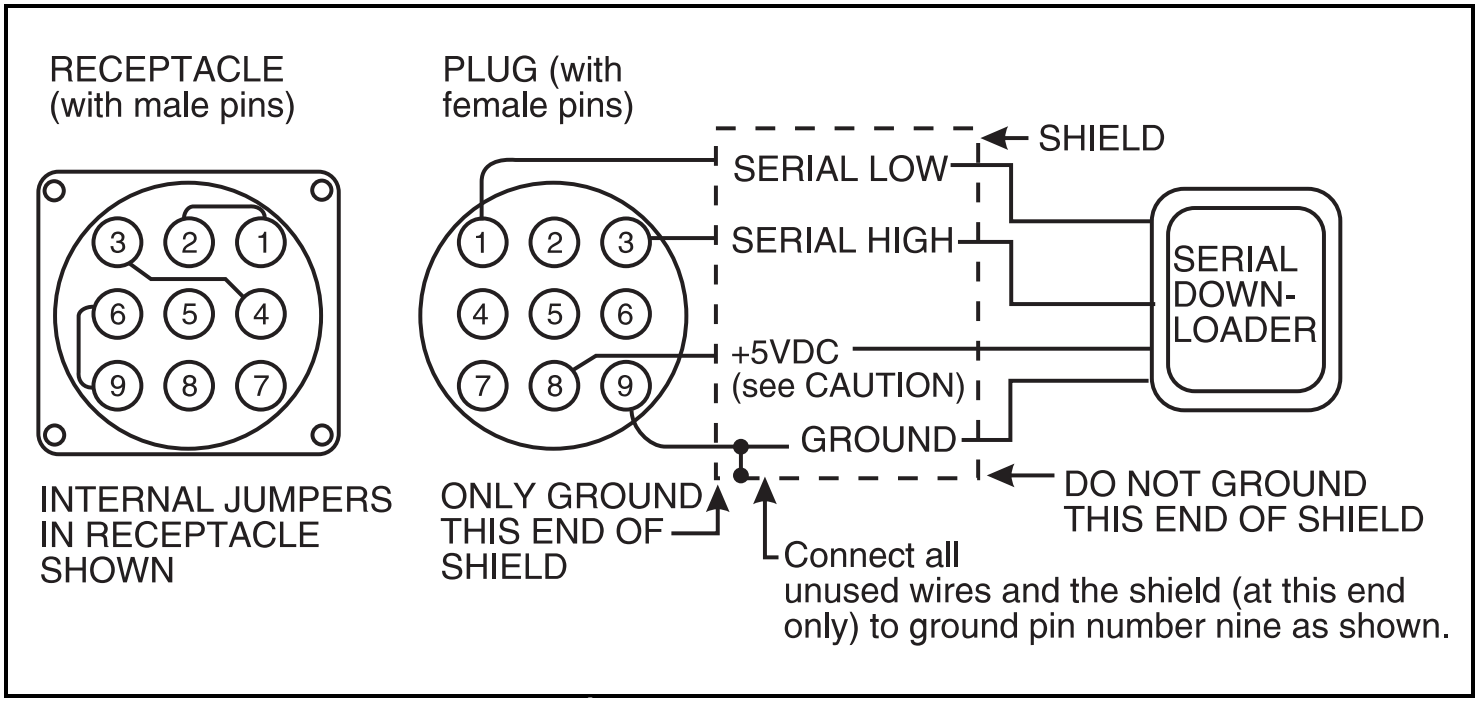


FIGURE 2 (MSSM0227AE)
Connections for Downloading Machine-to (from)-Serial Downloader

To Download From Machine-to-Machine(s)—FIGURE 3 illustrates how to construct a daisy chain serial link cable to download data from one machine to several others simultaneously. It is best to program one (MASTER) machine (or to DOWNLOAD using SERIAL DOWNLOADER-TO-MACHINE if the data is already stored in the downloader) and then to use a serial link to program the remainder from that MASTER. Any machine on the serial link can be the MASTER.

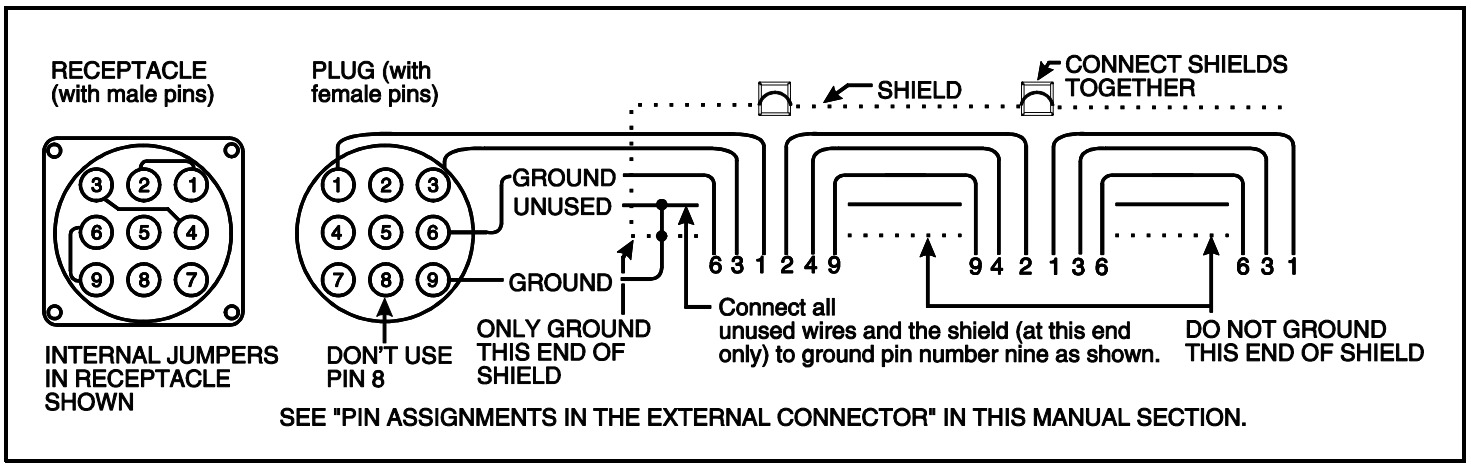


FIGURE 3 (MSSM0227AE)
Connections for Downloading From Machine-to-Machine(s)

For Print Data—The connections shown in FIGURE 4 are made at the factory if the factory furnishes the printer, or by whomever provides the printer. Where applicable, see the appropriate programming section in this manual for an explanation of the Print Data feature (see Table of Contents).

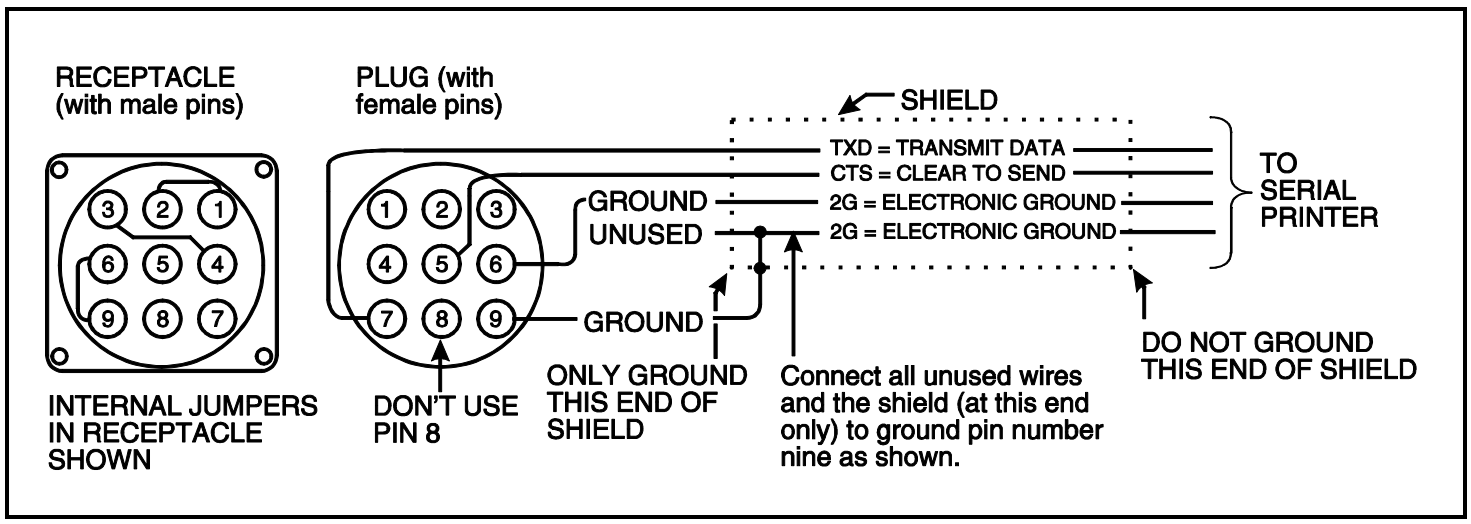


FIGURE 4 (MSSM0227AE)
Machine-to-Printer Connections

REQUIREMENTS AND SETTINGS FOR THE EPSON LX300 PRINTER

As of this writing, the Epson model LX300 printer is available from Milnor for printing data from microprocessor controllers with printing functions. (This printer replaces the Epson LX810, which replaced the Epson LX800. Refer to Milnor® document MSSM0251AE for information on these older printer models.) This document supplements the Epson LX300 User's Guide for printers used with Milnor controllers.

NOTICE: Because of the many differences among printer makes and models, Milnor® cannot ensure suitability or troubleshoot printers other than the Epson LX300 (or older approved models), with the required interface cable.

Cable Requirements—The Epson LX300 must be connected to the printer port on the machine using one of the following Milnor interface cables:

Part Number	Description
10YMK2PNTR	100-formula washer-extractor, dryer, extractor, and Miltron (CBW®) controllers
10YCBWPNTR	Non-serial Miltron (CBW®) controller

Required Settings—All printers shipped from Milnor® are pre-configured to operate correctly with Milnor® equipment. If the printer is replaced or loses its configuration, refer to the user's guide and re-configure the printer with the following values:

Setting	Value
Character spacing	10 cpi
Shape of zero	0
Skip-over-perforation	Off
Character table	PC 437
Auto line feed	Off
Page length	11 inches
Auto tear off	Off
Tractor	Single
Interface	Serial
Bit rate	9600 bps
Parity	Even
Data length	8 bit
ETX/ACT	On